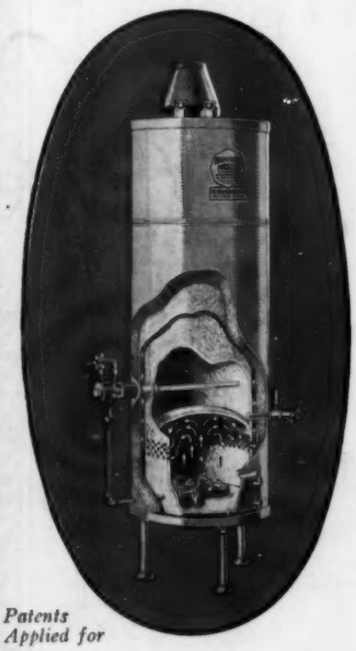
AMERICAN
GAS JOURNAL
Established 1859 Pioneer of the Gas Industry

VOL. 186 No. 3
WHOLE No. 3077

NEW YORK, SATURDAY, JUNE 18, 1927

Subscription, $3 Per Year
$4 Canada $5 Foreign

JUN 20 1927

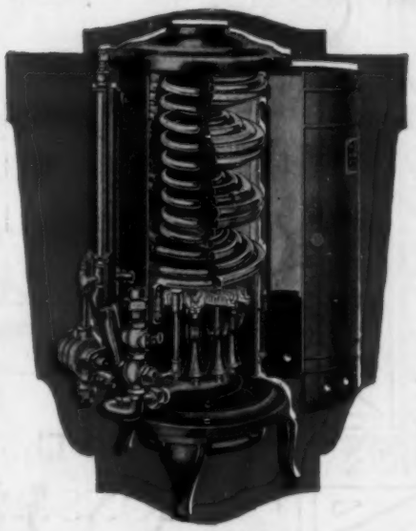


Patents Applied for

HOFFMAN MASTER

This newest Hoffman achievement is simply not to be classed with systems of the prevailing type, and the No. 3 instantaneous model is equally outstanding in superiority in its class.

No. 3 Automatic Gas Water Heater



Based on principles inherently high in heat efficiency, Hoffman engineers have also set a new high level for gas economy in these improved type water heaters.

Results are what count. And these results assure sales and satisfaction. Too, these heaters give you freedom from service requirements. They are *engineered* for perfect operation and *built* for long service.

It is useless to expect Hoffman results in any but a Hoffman heater. And if you are not familiar with all phases of Hoffman results you are invited to make a thorough investigation and subject these heaters to your own tests.

May we discuss this subject with you?

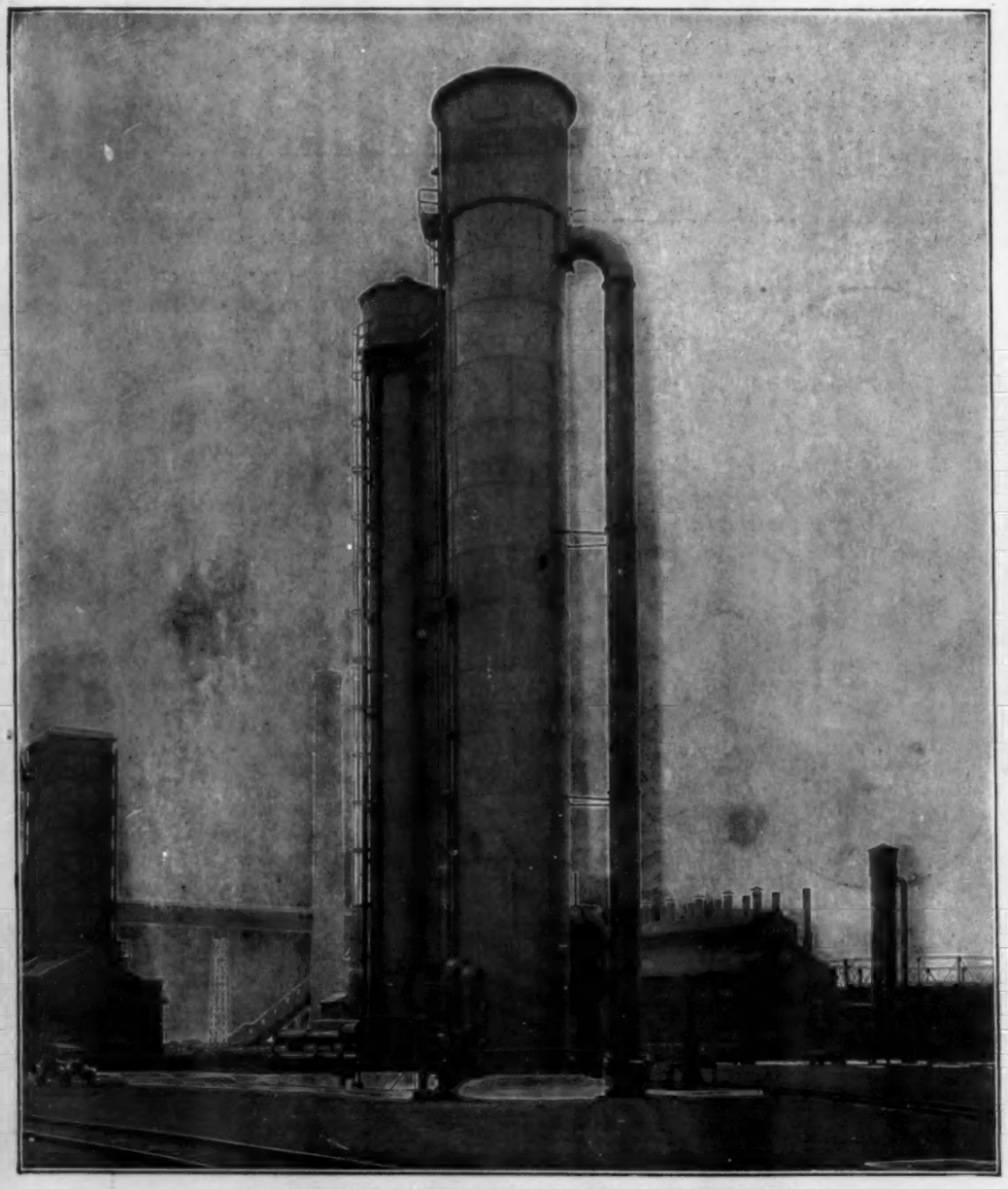
The Hoffman Heater Company

LOUISVILLE, KENTUCKY

Advertising Index, page 87

Index to Contents, page 4

NAPHTHALENE REMOVAL PLANTS—(Patented)



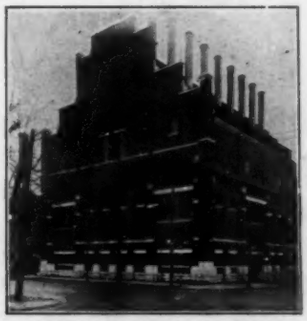
NAPHTHALENE INSTALLATION AT CHICAGO

The WESTERN GAS CONSTRUCTION COMPANY

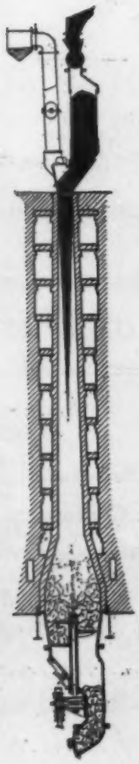
Subsidiary of The Koppers Company

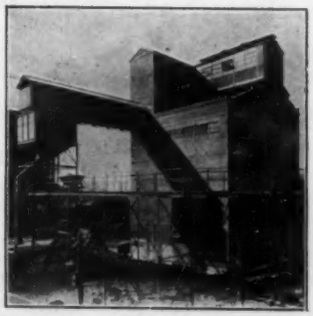
FORT WAYNE, IND.

GLOVER-WEST
Vertical Retorts

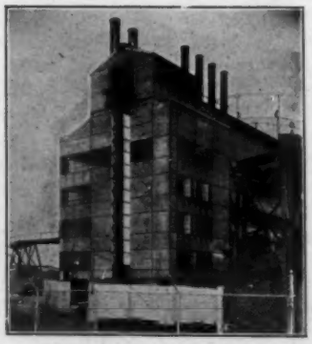


Toronto, Ont.
5,000,000 cu. ft. per day

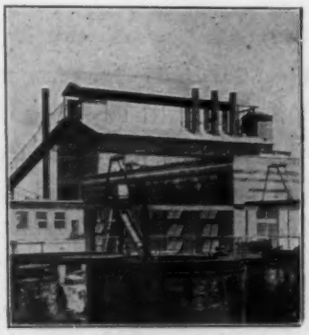




Fargo, N. D.
800,000 cu. ft. per day



Portland, Me., 2nd Plant
750,000 cu. ft. per day



Fall River, Mass.
1,600,000 cu. ft. per day

Plants *Completed* in 1926 and 1927

Also Completed—Stamford, Conn., 1,100,000 cu ft.; Buenos Aires, 3,500,000 cu. ft. Santiago, Chile, 3,000,000 cu. ft.; Toronto, Ont., 600,000 cu. ft. (extension)

Under Construction

Springfield, Mass. ..... 2,800,000 cu. ft.
Pawtucket, R. I. ..... 1,060,000 cu. ft.
Faribault, Minn. ..... 400,000 cu. ft.

WEST GAS IMPROVEMENT CO.

Builders of Coal Gas Plants

441 Lexington Ave. New York.

American Gas Journal

SIXTY-SEVENTH YEAR

Published Weekly by American Gas Light Journal, Inc., 53 Park Place, New York, N. Y.

S. G. KRAKE, Pres. and Treas. A. M. GLEASON, Sec'y

STANTON G. KRAKE, Managing Editor HENRY M. RILEY, Editor

Ismar Ginsberg, Associate Editor

"MEMBER OF THE AUDIT BUREAU OF CIRCULATIONS"

Contents of This Issue

Flue Gas Analysis—Chas. C. Krausse **599**

Successful A. G. A. Production Conference Held **604**

New England Regional Gas Sales Conference—H. P. Allen **605**

The Cleaning of Natural Gas—H. B. Milam **608**

Course in Gas Engineering at Johns Hopkins Is Unique—E. B. Luce **611**

Window Display Advertising—Ray Martin **612**

As the Journal Views It **613**

Industrial Gas Lesson—Lesson No. 174 ..... **614**

Gas Merchandising Ideas for the Man Who Sells—William H. Matlack **615**

Progress in Gas Technology **617**

News of the Gas Industry **619**

Subscription $3.00 per year, including postage, in the United States, Mexico, Cuba, Porto Rico, Hawaii or the Philippines; in Canada, $4.00; foreign, $5.00—Single Copies, 10 cents.

AMERICAN GAS JOURNAL, JUNE 18, 1927. Vol. 126. No. 25.
Published weekly by American Gas Light Journal, Inc., New York, N. Y.
Entered as second-class matter Jan. 9, 1917, at the post-office at New York, N. Y., under the Act of March 3, 1879.

AMERICAN
GAS JOURNAL
Established 1859— Pioneer of the Gas Industry

Vol. 126. No. 25 **NEW YORK, JUNE 18, 1927** **Whole No. 3637**

Flue Gas Analysis

Manipulation of apparatus and calculations

Chas. C. Krausse

Consolidated Gas, Electric Light and Power Co., Baltimore, Md.

WHEN gas is burned in an appliance, one of three conditions exists in the combustion chamber; that is, there is a neutral, oxidizing or reducing atmosphere present.

A neutral atmosphere is one in which the proper amount of air is supplied to the gas for complete combustion. An oxidizing atmosphere exists when more air is supplied than is necessary for complete combustion, and a reducing atmosphere is one in which an insufficient amount of air is supplied to burn the gas used by the appliance.

For the great majority of purposes a neutral atmosphere is desired as the efficiency of the appliance is at a maximum, while this flame adjustment is present; however, for certain particular purposes, oxidizing and reducing atmospheres are more desirable. In drying operations where a direct heat can be used, an oxidizing atmosphere is desirable, as moisture is readily absorbed by dry air, and consequently the process is speeded up by the introduction of excess air. When melting brass, after the furnace has been heated and the metal has started to melt, a slightly reducing atmosphere (about .5 per cent CO) is desirable, as it decreases shrinkage of the metal. Appliances which are operated with a reducing atmosphere should be supplied with vents to convey the flue gases to a stack or point outside the building, as the carbon-monoxide gas given off during the operation is very poisonous.

Difficult to Detect Improper Adjustment

While the conditions described above are in most cases readily apparent to the gas fuel specialist, it must be remembered that gas appliances are operated by men of various degrees of training, experience and intelligence, and that practically none of the operators can be classed as specialists. To the untrained eye, it is almost impossible to detect an improper adjustment of the air and gas mixture by the characteristics of the flame in the combustion chamber. A number of conditions exist which at times deceive the eye of some of the most experienced operators, as, for instance, in some furnaces particles of dust heated to incandescence give the appearance of a reducing atmosphere when an excess of air is really being supplied and the atmosphere is oxidizing.

Significance of Green Flame

A reducing atmosphere can in most cases be discerned by the appearance of a greenish flame appearing in the appliance stack or vent. An oxidizing atmosphere can usually be detected by cold spots on the walls of the combustion chamber opposite gas burners, and by the unusual amount of scale shown on any steel which may be undergoing treatment in the appliance.

The composition of the flue gases is an accurate index of the adjustment and operation of an appliance. When gas or any other fuel is burned properly, the flue gases contain nitrogen, water vapor and carbon-dioxide. The amount of air to be supplied any gas-burning appliance can be determined if the amount of gas supplied and the analysis of the gas is known, and, likewise, the amount of air supplied the appliance can be determined by finding the amount of carbon-dioxide in the flue gases.

When an insufficient quantity of air is supplied to burn the gas completely, or when the flame temperature is chilled below the ignition point of some of the gases, as, for instance, by a violent gust of air or the introduction of a cold object into the flame, some of the gas will escape combustion and leave the furnace with the flue gases. This gas which escapes combustion is carbon-monoxide. It is an odorless, colorless gas of about the same specific gravity as air, and is poisonous. A relatively small amount of carbon-monoxide, if present in the atmosphere, will cause the death of persons or animals.

Nitrogen is but slightly soluble in water, has a specific gravity of .97010, and is odorless and colorless.

Oxygen is a colorless and odorless gas having a specific gravity of 1.10521 and is but slightly soluble in water.

Carbon-dioxide is a colorless, odorless gas which has a specific gravity of 1.529. While many people are of the opinion that carbon-dioxide is a poisonous gas, it has been demonstrated by recent tests at the University of Wisconsin that relatively large amounts of it can be present in the atmosphere and no ill effects will be felt if the air is properly agitated and cooled.

In ordinary practice, it is not always necessary to determine the amount of carbon-monoxide in the gas, as there is little danger of carbon-monoxide in the flue gas when the percentage of carbon-dioxide is about 10 per cent and oxygen is present.

As the per cent of carbon-dioxide in the flue gas varies with the analysis of the fuel gas, the theoretical amount of carbon-dioxide should be calculated from time to time, in order to have a check on the actual amount obtained in practice.

That is, the amount of oxygen required is three times the volume of illuminants when assumed to be ethene (C_2H_4), twice the amount of methane ($C H_4$), one-half the amount of carbon monoxide ($C O$), and one-half the amount of hydrogen (H_2).

The air required is 4.808 times the amount of oxygen required and the amount of nitrogen carried in this air is 3.808 times the volume of oxygen required for complete combustion of the gas.

The amount of carbon dioxide and water vapor formed from the ethene (C_2H_4) is twice the volume of the ethene. The amount of carbon dioxide formed from the carbon monoxide is half the volume of carbon monoxide. The amount of carbon dioxide formed from the methane ($C H_4$) is equal to the volume of methane and the water vapor formed is twice the volume of methane. The amount of water vapor formed from the hydrogen is equal to the volume of hydrogen. The amount of oxygen in the gas should be subtracted from the total amount of oxygen required, and also its equivalent amount of air from the total amount of air required.

Combustion Table

Analysis		O_2 Req.	Air Req.	CO_2 Formed	H_2O Formed	N_2 Carried
$C O_2$	4.0%	.....	.....	.040	.....	.....
Ill.	7.3%	.219	1.053	.146	.146	.834
O_2	.2%	—.002	—.009	.....	.....	—.008
$C O$	27.5%	.138	.664	.138	.252	.526
$C H_4$	12.6%	.252	1.212	.126	.382	.960
H_2	38.2%	.191	.918	.....	.....	.727
N_2	10.2%	.....	.....	.....	.....	.102
	100.0%	.798	3.838	.450	.780	3.141

Calculation of Carbon-Dioxide in Flue Gas

The following example shows the method of calculating the amount of carbon-dioxide in the flue gas:

Assume the analysis of the fuel gas to be:

Carbon dioxide	CO_2	4.0%
Illuminants	C_2H_4	7.3%
Oxygen	O_2	.2%
Carbon monoxide	CO	27.5%
Methane	CH_4	12.6%
Hydrogen	H_2	38.2%
Nitrogen	N_2	10.2%
Total		100.0%

Of these elements only four are combustible gases, namely, Hydrogen (H_2), Carbon Monoxide (CO), Methane (CH_4) and Illuminants (which is, we will assume to be, Ethene (C_2H_4). The chemical equation, representing the reaction when these gases are burned completely, are as follows:

(Ethene) $C_2H_4 + 3\,O_2 = 2\,C\,O_2 + 2\,H_2O$
(Carbon monoxide) $2\,C\,O + O_2 = 2\,C\,O_2$
(Methane) $C\,H_4 + 2\,O_2 = C\,O_2 + 2\,H_2O$
(Hydrogen) $2\,H_2 + O_2 = 2\,H_2O$

$C\,O_2 = .450$
$N_2 = 3.141$

Total products of combustion (Dry) 3.591

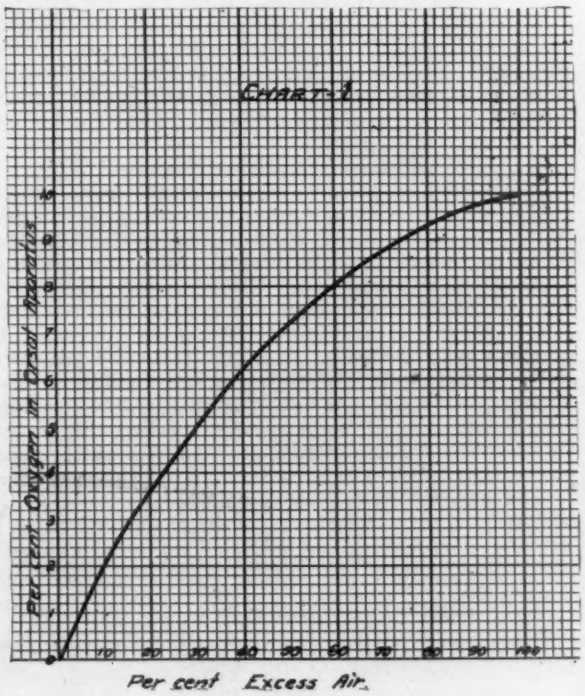
The maximum per cent of $C\,O_2$ in flue gas is reached when there is no excess air.

Therefore: $\frac{.450}{3.591} = 12.5\%$ maximum $C\,O_2$

Increasing the amount of excess air will increase the amount of oxygen in flue gas, so that by means of this per cent of oxygen the per cent. of excess air can be obtained.

Chart 1 shows the per cent of excess air corresponding to the per cent of oxygen in the flue gases.

Chart 2 shows the effect of excess gas and excess air on gas consumption for various working temperatures. From examination of the curves, it is not difficult to draw conclusions. At low working temperature excess gas or excess air has comparatively little influence on the gas consumption, but this influence increases very rapidly as the working temperature increases. It is impossible to obtain working temperature around 2500 degrees Fahrenheit with an economy of gas consumption, when even a small amount of excess gas or excess air is present.



Orsat Apparatus

In order to determine the amount of the various gases in the products of combustion, the flue gases are analyzed by the volumetric method in an apparatus called the "Orsat" or Flue Gas Analyzer.

The volumetric method is used because it is exceedingly difficult to weigh gases, and if the weights are desired they can be computed when the percentages by volume are known.

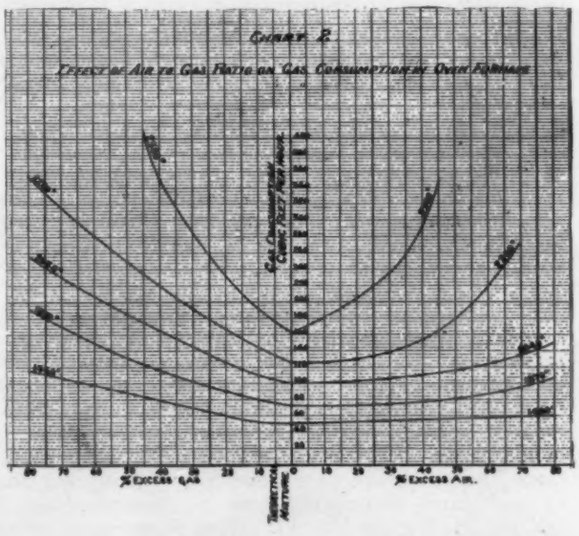
The flue gas analyzing apparatus shown in figure 1 consists of a leveling bottle, one measuring burette and three pipettes or absorption bulbs connected by a series of piping and cocks. The measuring burette is made for 50 C. C. or 100 C. C. capacity of flue gas sample. For ordinary practice the 50 C. C. measuring burette give satisfactory results. When very accurate determination is required, it is better to use the 100 C. C. measuring burette. The measuring burette consists of a glass tube with the top enlarged so as to contain from 50 to 75 per cent of the sample. The lower portion of the tube contains the remaining volume and is graduated to read to .2 to 1 per cent. The burette is enclosed in a water jacket for the purpose of preventing any change in temperature during the analysis which might affect the density or volume of the gas being analyzed.

The first pipette contains a solution of caustic potash, or potassium hydroxide (K O H), for the absorption of carbon-dioxide. This solution is prepared by dissolving one part by weight of caustic potash in 2½ parts of distilled water. The second pipette contains an alkaline solution of pyrogallol for the absorption of oxygen, and is prepared by dissolving one part by weight of pyrogallic acid in two parts of hot water, to which is added three parts of the caustic potash solution, the latter being prepared as described for the first pipette. The third pipette contains a cuprous chloride solution for the absorption of carbon-monoxide. This solution is prepared by dissolving one part by weight of cuprous chloride in seven parts of hydrochloric acid, to which two parts of copper clippings are added, the solution should then be allowed to stand for 24 hours and just before using three parts of water should be added.

The absorption bulbs contain glass tubing, steel or copper wool to increase the absorption surface exposed to the gases.

Procedure Before Collecting Sample

Before attempting to collect the sample of flue gas for analysis, examine the instrument carefully. Be sure that all the solutions are about the proper height in the capillary tubes; that is, about midway. Also make certain that the absorption pipettes are full, as it is possible that the solution may be midway in capillary tube and the absorption pipettes partially empty.



Having assured yourself that the instrument is in proper working condition, place the three-way cock in position 1 (Figure 1). Connect the sampling tube with aspirator to the three-way cock; lower the leveling bottle to a position near the bottom of instrument and begin forcing flue gases through the measuring burette and levelling bottle. The amount of pumping required to get a fair sample of flue gas depends upon the length of tubing and the manner in which you compress the aspirator. Be a little careful with the first few samples. Afterwards you will soon know about how much pumping it takes to get a fair sample. Seal the sample in the instrument by turning cock to position No. 3.

In case there is no aspirator it is necessary to draw in the sample by means of the leveling bottle. With the instrument cleared of all air and ready

to use, put three-way cock in position No. 1 and lower leveling bottle to position slightly below level of bottom of instrument. The water seeking its level will draw in the flue gas. When the measuring burette is nearly full, raise the leveling bottle to a

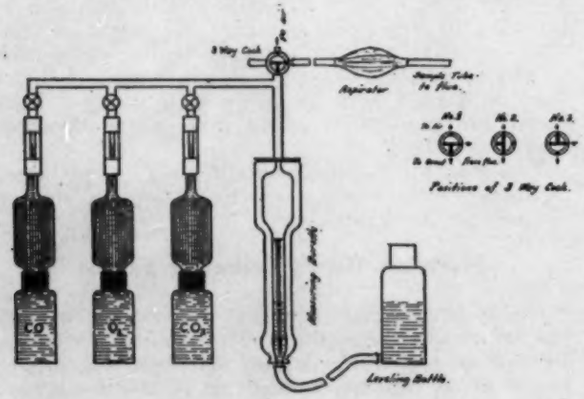


Fig. 1
Diagram of Orsat.

position higher than the instrument and change the three-way cock to position No. 2, turning it in clockwise direction. Continue this three or four times and then keep the last sample in burette by turning cock to position No. 3. Be sure that this sample is a little more than that required for analysis. This is done because with the leveling bottle in the low position it is impossible to tell when you have the exact amount.

Now, having a sample of flue gas for analysis, disconnect sampling tube and take the instrument to a place where there is a good light from the back, if the present position does not give it.

Obtaining Exact Volume for Analysis

In order to get the exact volume for analysis take the leveling bottle in your left hand and hold it close to the burette, steadying your hand against the instrument case. Get your eye, surface of water in the leveling bottle and zero mark of burette in same line as shown in Figure No. 2 (Diagram No. 1) and turn three-way cock to position No. 2 (shown in Figure No. 1). The water in leveling bottle will flow from bottle into the burette and drive the excess gas out through the air vent of the cock.

You will notice that the water in the burette has a curved appearance. When the bottom of this curve, or "meniscus," as it is called, is on the zero mark change the three-way cock to position No. 3.

Making this first gas measurement is the most difficult part of the gas analysis. You must not lower the leveling bottle while making the measurement, as this would cause water to flow from the burette into the bottle and air would be drawn in through the vent of the cock. This would mix with the gas and spoil the sample. Now having the proper amount of gas sample locked in the instrument you will find that if the leveling bottle is raised the gas is compressed and the volume diminishes, and that if you lower the bottle the gas is rarified and the volume increases. If you put the bottle on the zero mark the water in the burette will return to zero. This experiment makes clear how important it is to exercise care in making the original measurement and how necessary it is to make all measurements at atmospheric pressure.

Removing Carbon Dioxide

The next step is to remove the CO_2 from the gas in the burette. Raise the leveling bottle with the left hand and turn the valve above the caustic (KOH) absorption bulb. The gas will flow from the burette into the bulb of the container. Watch the water in the burette closely, paying no attention to the absorption bulb. You may push the gas over very rapidly until the water nears the top of the burette, when you must slow it up with the leveling bottle and proceed very slowly. When the water reaches the capillary tube above the burette close the valve.

The gas has now been transferred to the caustic absorption bulb and the solution of potassium hydroxide is absorbing the CO_2. The chemical reaction taking place is represented by the following equation:

$$2\ KOH + CO_2 = K_2CO_3 + H_2O.$$

The absorption is very rapid and the gas can be returned immediately to the burette.

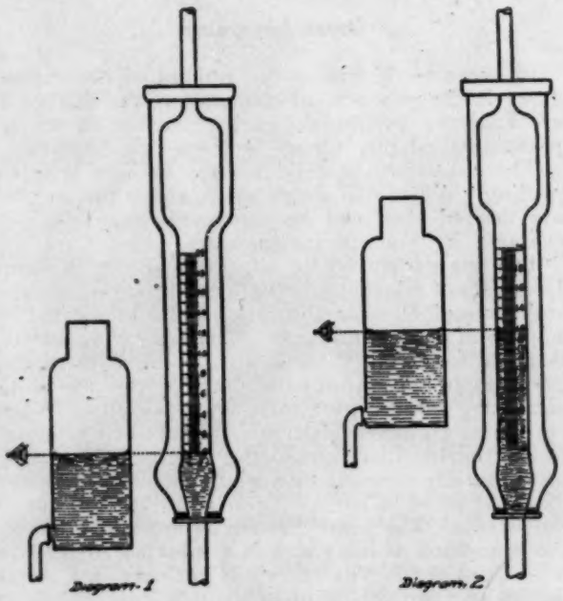


Fig. 2.
Method of Reading Burette of Orsat.

Open the valve and lower the leveling bottle; pay no attention to the water in the burette. Watch only the solution closely. You may bring the gas back very rapidly until the caustic solution nears the top of the bulb, when you must slow it up with

the leveling bottle and bring the solution up into the capillary tube. Stop the solution about midway of the tube and be careful that you do not draw any of it over into the burette.

Now bring your eye, the surface of the water in the leveling bottle and the bottom of the meniscus in the burette into the same horizontal plane as shown in Figure No. 2 (Diagram No. 2), allowing the water in the burette to come where it will and read the scale of the burette. The gas is again at the temperature of the water in the jacket and it is at atmospheric pressure. The reading shown on scale of the burette is the amount of carbon-dioxide contained in the gas.

Absorbing Oxygen

Make a memorandum of the amount of CO_2 and then proceeding as you did in determining CO_2, but sending the gas to the second pipette, which is charged with alkaline solution of pyrogallol. Allow the gas to remain for about one-half a minute, then return it to the burette and measure, noting the reading. Return the gas again to the oxygen absorption bulb and repeat the operation until you get two readings that are the same. Then you have obsorbed all the oxygen.

Suppose after the CO_2 absorption the reading is 12 per cent, and after the oxygen absorption 12.4 per cent. The amount of oxygen is the difference between these readings or .4 per cent. You then proceed in the like manner to absorb the CO. If this absorption is made by an acid solution of cuprous chloride, pass the gas into the potassium hydroxide or CO_2 absorption bulb before making the final reading, in order to absorb any hydrochloric acid vapor that may have mixed with the gas during this absorption.

Suppose the final reading is 13 per cent the amount of CO in the gas is represented by the difference between this reading and the reading after the oxygen absorption 12.4 per cent or .6 per cent CO in the gas. The nitrogen is the difference between 100 per cent and the CO reading, or 87 per cent nitrogen. The complete flue analysis is then:

CO_2	—	12.0%
O_2	—	.4%
CO	—	.6%
N_2	—	87.0%
		100.0%

In making the flue gas analysis be sure that all of the CO_2 has been removed before trying for the oxygen and be doubly sure that all of the oxygen has been removed before trying for CO. The absorption of the oxygen and CO takes place very slowly and great care must be exercised in making the measurements. The solution used for the oxygen will also absorb CO_2 and that used for CO will absorb all three gases. For these reasons you must first take out the CO_2 before trying for the oxygen and you must take out the oxygen before analyzing for CO.

One exposure is all that will be necessary to get all of the CO_2 when the potassium hydroxide is fresh. The solution will be good for about 100 absorptions. If you think that the solution may be getting stale pass the gas over a second time. If you get an additional absorption give the gas a little more time in the caustic absorption bulb or change the solution. The oxygen and CO absorption solutions deteriorate on exposure to air and light. Keep the absorption bulbs stopped when not in use, and store the reserve supply in a dark place. The water used in the leveling bottle should be saturated with the gas before making the CO_2 determination, as fresh water will absorb an equal volume of this gas. It is well to make this water slightly acid by means of sulphuric acid and color the water by means of methylorange. This will also serve as an indicator for the water should any of the potassium hydroxide be drawn over into the measuring burette. This solution will be turned yellow by alkalies and a pink-red color by acids.

More use of the Orsat should be made in adjusting appliances, regardless of the system of burning the gas. With a two pipe air and gas mixing system where the human element enters into the adjustment of the mixture it is of extreme importance to use the Orsat from time to time as a check. Where automatic mixing devices are used for proportioning the air to gas ratio, the Orsat should also be used occasionally to check the functioning of the machine with the composition of the gas.

The Orsat has been looked upon in the past as a complicated apparatus and the majority of factory managers have been skeptical as to its advantages, but they are gradually becoming convinced to the fact that considerable saving in gas can be affected by proper adjustment of air to gas ratio, and this adjustment can be best made by the Orsat.

¤ ¤ ¤ ¤

GAS TO END SKYSCRAPER FIRES

What is believed to be the first application of manufactured gas to the actual construction of a building is being carried on, with pronounced success, by the Consolidated Gas Company in the erection of its new office building on the site of the old Academy of Music at 14th Street and Irving Place.

A gas-fired rivet heater was used and this entirely does away with the type of fire hazard that was said to have caused New York's most spectacular blaze in the tower of the Sherry-Netherland Hotel a scant few weeks ago. Newspapers the next morning said that the fire was caused by a salamander using solid fuel.

The use of gas eliminates the danger as well as the cost, labor and inconvenience of passing around live coals.

Other uses for gas in construction jobs are the substitution of manufactured gas in place of acetylene for metal cutting; gas-fired forges for repairing tools; and the melting of tar for waterproofing. Speed is one of the principal advantages of gas in the blacksmith's forge, while the automatic regulation of temperature, made possible by gas, is an important factor in tar melting.

Successful A. G. A. Production Conference Held

Large attendance and vigorous discussion make enthusiastic success of initial gathering

Editorial Staff Report

"NO production engineer can afford to miss the presentation and discussion of these subjects." Thus wrote one of the A. G. A. officers in announcing to gas company members of the association the plans for the first Production Conference, held in Detroit May 31 to June 1. And, if one can judge from the large attendance, the vigorous discussion and the enthusiastic comment on the meeting, this forecast was more than carried out by the meeting itself.

Approximately 300 engineers interested in the manufacture of coal gas and water gas were registered and participated actively in the two days' proceedings. The four sessions were all splendidly attended and filled from start to finish with brief but valuable presentation of papers and active extemporaneous discussion that left no stone unturned to develop all of the pertinent fundamental facts on the subject under consideration.

The sessions were under the joint chairmanship of the chairman of the carbonization committee and the water-gas committee of the association, Messrs. R. G. Porter and Henry Fink. Mr. H. W. Hartman, secretary of the Technical Section of the association, served ably as secretary and business manager for the conference.

Coal-Gas Production

A summary was presented of the replies to the association questionnaire regarding methods of handling base-load and peak-load gas, by Mr. A. W. Warner. It was pointed out that coal-gas units are not only largely used for base-load gas supply now, but that there seems to be a growing sentiment throughout the industry that base-load gas supply will eventually be from coal-gas equipment and that other types of manufacturing apparatus involving less investment cost per unit of capacity will be used for peak-load production. However, Mr. Warner did not undertake in his summary to make any generalizations or to give detailed reports of the present practice and the judgment of engineers on these important points.

In response to Mr. Warner's request for a discussion of the proper definition of base-load gas and peak-load gas considerable argument developed and a wide variety of proposals were made to the conference. Some preferred using maximum and minimum day, some the average of three successive days, some monthly averages, as the basis for ratings. One proposal that apparently inspired greater support than any other was that the base-load should be regarded as the average load during the minimum month, but that the peak load should be regarded as the load on the maximum single day. No formal action was taken regarding this matter, as it was recognized by the discussion that the subject should be referred to the managing committee of the Technical Section for further investigation before any conclusion was reached on behalf of the association.

House-Heating Problems

Apparently the major cause of concern over the relation between minimum and peak loads is the uncertainty as to the effect upon gas companies of the house-heating business which is in prospect. It was variously estimated by speakers what will be the relation between average or minimum day and peak day with the increase in the house-heating business. But it appeared to be the general sentiment that at least some companies would be confronted with a ratio of one to six between base load and peak load, and that as a result very careful economic and engineering studies were required.

Mr. L. J. Willien presented a progress report on the present production methods as being studied for the association by the special committee on "Economic and Engineering Survey of the Gas Industry." This committee, which will not report until the October convention of the association, has required a careful study of manufacturing processes, load factors, plant lay-out, new processes in prospect, and the use of stand-by equipment and purchased gas. In discussing the question of purchased gas it was pointed out that under certain circumstances the question of purifying, pumping and mixing costs offset the low-price advantage which would otherwise exist for such auxiliary supplies, even when they are of suitable quality and available in reasonable quantity regularly. It was urged that all of these auxiliary costs for mixing gas available be carefully considered when a purchase contract was contemplated.

Manufacturers Asked to Co-operate

In order that the committee could study the possibilities of coal-gas manufacture with modern equipment to advantage builders of coal-gas equipment have been asked to estimate for the committee on the installation cost and the operating results to be expected from modern systems. These concerns have been asked to regard a variation of plus or minus ten per cent in specific gravity as the limit which should be made for purpose of estimating, but have been given free run as to the choice of methods of manufacturing and heating value of gas to be made, assuming in each case that the most economic system is wanted. It is hoped that the

results of such a study supplemented by committee work will afford a basis for recommending certain principles to the association when the committee work has been completed.

As was pointed out by one of the speakers, "The industry wants the lowest over-all cost of gas in the holder." Anything which will contribute to that will be welcomed, especially by those executives who are confronted with serious electric, oil or coal competition. In emphasizing the need for studying new systems with this in view, it was pointed out, however, that there was no likelihood that existing water-gas plants would need to be scrapped, for such equipment will be needed to afford adequate peak-load manufacturing capacity and will afford such capacity with little or no new investment.

Laboratory Research Plans

Much of the uncertainty as to the technical significance of gas mixing has been recognized by officials of the association as due to lack of knowledge of actual behavior of mixed gases in service. The association has taken steps to remedy this lack of information by an extended laboratory study which is being carried out in the Central Laboratory of the A. G. A. at Cleveland. Mr. G. B. Shawn, who is in immediate charge of this testing work, reported on the plans for this project.

It is proposed that the first study shall be made of the effect of specific gravity and related changes upon appliance behavior. Water-gas and coke-oven gas, each of about 550 B.t.u., are available and various admixtures of producer gas, blue-water gas and natural gas are possible because of the strategic location of the laboratory. Tests will be made to determine the effect of changes in heating value, changes in specific gravity and changes in chemical composition on typical burning appliances. The initial studies contemplate use of three types of ranges, three varieties of radiant heaters, three different styles of water heaters, one boiler, one muffle furnace, and one cutting torch. A three-year program of work along these lines is contemplated.

It was pointed out by one of the most prominent members of the association present that it is practically impossible to carry to a satisfactory or definite conclusion most of the economic studies in progress under the association direction until the fundamental results of appliance behavior are obtained from this investigation.

Coke Disposal

The results from a considerable number of practical operations had been summarized for the conference by Mr. A. M. Beebee in order to bring out the best present judgment as to what qualities of coke can and should be controlled in order to develop household markets. The following properties of coke are apparently regarded as of importance, more or less in the order in which they are stated: Size, ash quality, cleanliness, moisture, clinker tendency, volatile content, structure, strength, weight, appearance, sulphur content and reactivity. Mr. Beebee's summary indicated the conditions which were controllable, either by coal selection, plant equipment, or method of operation, and outlined some of the types of coke handling which are now widely favored. A wide variety of sizing, screening and handling was evident, but it was clear that there is a general consensus of opinion in favor of the maximum possible care in order to encourage the development of household coke markets.

The property of coke which seemed to develop the most discussion was that of reactivity or burning characteristics. Mr. J. D. Davis, of the U. S. Bureau of Mines, presented curves and photographs of further tests that have been conducted by the Bureau on cokes made in the carbonization committee tests of gas plants during the previous year. The most important new feature pointed out by Mr. Davis was that dull coke appears to be distinctly more reactive than bright coke, whether considered from the standpoint of burning in air, or reaction with CO_2 or with steam in a water-gas generator.

Further work was reported by Mr. P. Nicholls, also of the Bureau of Mines, on the burning properties of high-temperature and low-temperature cokes tested in a household heater. Special attention has been given in this work to the effect of size upon the rapidity of burning and the facility of banking coke in domestic heaters. Because of the limited number of tests conducted and the preliminary nature of the work, Mr. Nicholls declined to generalize. But he pointed out the great importance of maintenance of coke size on a proper basis in accordance with the character of the heating equipment used.

Water-Gas Clinker

An extended study has been made by an association committee on clinker formation in water-gas generators and means for prevention of clinker. All of this was summarized by Mr. E. J. Murphy, who had tabulated and digested the answers from 33 reports of practical operating results in gas works. These reports showed that a very large number of companies determined the fusion point of the ash in the coal or coke used, but there was a surprising disagreement as to whether the fusing point of the ash so measured had any direct bearing upon the question of tendency of the fuel to clinker. It was pointed out in the discussion, however, that many measurements of ash fusing point are of no significance because the tests have not been made under the conditions which prevail in a water-gas machine. In this connection it was explained that the occurrence of oxidizing or reducing atmosphere during the test may cause a very wide difference in the melting point observed, especially if the ash is high in iron.

Discussion of Generator Refractory Linings

The discussion of clinker formation inevitably led to a discussion of generator refractory linings, in-

cluding particularly a discussion as to the merits of the carborundum type of refractory and of ventilated refractory blocks. Several engineers who reported difficulty due to the swelling of carborundum refractory received valuable suggestions from others who took part in the discussion as to means of preventing damage due to the tendency of this material to swell during use. It was pointed out that a carborundum lining must always be laid up with a backing which will flow sufficiently to permit the carborundum to swell during aging in place. In one instance it was pointed out that a backing of clay two inches thick was practically altogether squeezed out by this expansion because the lining of the set (an eleven-foot machine) expanded by nearly this amount during the first few months of use.

It seemed to be the consensus of opinion that regardless of the refractory used, a low-fusing point ash could easily be eliminated from a generator by slagging it down off the wall, and that some few coals could be operated with practically no side-wall clinker formation. But it was also evident from the discussion that with practically all coals under practically all operating conditions the complete elimination of side-wall clinker was very difficult and that some barring down of a machine is almost inevitable for its removal.

¤ ¤ ¤ ¤

NEW ENGLAND REGIONAL GAS SALES CONFERENCE

Some Plain But Helpful Gas Sales Discussion Indulged In

H. P. Allen

THE Third New England Regional Gas Sales Conference was held at the Hotel Mohican, New London, Connecticut, on Friday and Saturday, June 3rd and 4th. The gas men attending this conference were unanimous in expressing the opinion that this conference was the most interesting and instructive meeting which has ever been conducted by the New England Gas Association.

Approximately one hundred and forty representatives were present when the conference was opened at 2 P. M. by Mr. William Gould as chairman. Mr. Gould complimented the New England Gas Association for the large attendance, and stressed the point that the main reason for their presence was to take something away with them which would be of help to the gas industry. He said that a lot of thought had been given to the preparation of the program and it was up to each individual to get as much as possible out of the meeting.

"Selling Gas for Water Heating"

Mr. A. L. Kebbe, sales manager of the Connecticut Power Company, welcomed the members to New London and presented a paper on "Selling Gas for Water Heating." In the discussion of this paper the following representatives outlined the policies which are in effect at their respective companies regarding the sale of gas fired water heaters:

Mr. Howard B. Hall, of the Old Colony Gas Company at East Braintree, Mass., stated that his company had tried to work along the lines as outlined in Mr. Kebbe's paper, except that in working with the plumbers the advertising was paid entirely by the company.

Mr. J. H. Sumner, sales manager of the Cambridge Gas Light Company, said that owing to the fact that a great deal of the plumbing in his city was done by plumbers outside of the territory, cooperation with them was somewhat out of the question. He also stated that paying the salesmen a salary only somewhat retarded the sale of water heaters. However, his company is now considering paying a small commission on all sales.

Mr. E. B. Flaherty, assistant sales manager, Fitchburg Gas and Electric Light Company, Fitchburg, Mass., read a very instructive paper on "Selling Gas for Water Heating."

Mr. V. E. Bird, general manager of the Connecticut Power Company, gave a talk on "Gas House Heating from the Executive's Point of View." Mr. Bird's paper will be published in a later edition of the Journal.

House Heating Sold Without Advertising

Mr. L. A. Keen, of the Haverhill Gas Light Company, described how they are selling house heating equipment at Haverhill. He stated that approximately one hundred and eighty jobs are connected to their lines and they have accomplished this with no advertising. When the Haverhill Gas Light Company started house heating some three years ago, three jobs were installed in the homes of prominent Haverhill citizens and they were billed the regular rate for the gas consumed. At the end of a year the service which the boiler had given the customer was analyzed with him and if he was dissatisfied with the service of the gas equipment the boiler would be taken out with no cost to him except the gas bill. All three of the first customers retained their heaters, and so the house heating business in Haverhill started. Other prospects were obtained from these satisfied users.

Mr. J. W. Clark, of the Stamford Gas and Electric Company, described how they are selling house heaters at Stamford. He stated that they had no sales department in his company. The work was done in conjunction with the local plumbers. All of the advertising was handled as follows: For each dollar the plumbers put up the Stamford Gas and Electric Company expended another dollar.

Mr. R. A. Gordon, Pawtucket Gas Company, read a paper: "Selling Auxiliary Heating, Including Garage Heating."

Very Interesting Report

At the Saturday morning session Mr. A. M. Crossley, of Crossley, Inc., New York, outlined "What the A. G. A. National Customer Survey Shows." This report was probably the most interesting on the

progam. The following are some of the points brought out:

There is a greater fear of gas among the executives and members of gas companies than any other class of people in the United States. This class of people is a very small percentage, as 81 per cent of the people surveyed had no fear whatsoever. The speaker also stated that although 98½ per cent of the people prefer gas for heating over oil, the sale of oil burners is considerably higher than gas fired house heaters. Fifty per cent of the dwellings being erected today are apartment houses. Curves were exhibited which showed that the lower the rate the greater the sale of gas.

In connection with gas heaters there are three reasons why people do not use gas:

1. Initial Cost.
2. Operating cost.
3. Preference for other fuels.

In the sale of automatic water heaters the first reason stands out. In the sale of space heaters the second and third reasons stand out prominently.

Electricity is a very great competitor of gas in the space heating field. In large cities 79 per cent of the people have gas ranges and 30 per cent have water heaters.

Uniform Policy Needed

Taking the survey as a whole, Mr. Crossley said that the total volume of gas sales shows an increase, but the per customer sale of gas shows a decrease. The gas industry is in need of a uniform policy regarding the sale of gas. The general public is ready to pay on a reasonable basis. The survey shows very conclusively the varying service, sales and advertising methods.

Mrs. Elizabeth Macdonald, director, Bureau of Consumer Research, Boston University, talked on Home Economics as Applied to the Gas Industry. Mrs. Macdonald stated that, in her opinion, unless the gas companies were willing to put a home economics department on a real business basis and spend some money with it, they should leave the matter entirely alone. She also stated that there was no reason at all for combating the idea of canned foods. The canned food business is here to stay and we should recognize the fact. However, gas can be used very nicely to prepare this food for the table.

The Refrigeration Skit, "Selling the Seller," put on by Mr. J. L. Johnson, sales manager, Providence Gas Light Company, and Mr. A. L. Kebbe, of the Connecticut Power Company, was a great success.

Mr. M. B. Webber, governor of the sales division of the New England Gas Association, read the report and resolution of the New England Regional Commercial Policy Committee.

✡ ✡ ✡ ✡

MANUFACTURE OF FAMOUS DAMASCUS SWORDS STILL CARRIED ON BY GAS HEAT

The sword of Damascus, the acme of the ancient craft of swordmaking, is now equalled by modern sword-making practice in a plant in Ohio, according to A. M. Forkner, of the Columbia Gas and Electric Company, Cincinnati. The forge of the ancients has also given away to modern gas-fired furnaces that turn out swords as fine as those that the old artisans hammered out.

"While swordmaking is still a handicraft, modern machinery is able to make the weapons just as well and in much larger numbers," says Mr. Forkner. "Mechanical hammers pound out the steel bars and modern heat-treating processes insure a well-tempered blade quality. The company has used gas for fifteen years.

"The ancient code is still carried on in modern processes. A good sword should be elastic, to stand bending or a heavy blow without breaking; yet it must be stiff enough to yield a powerful thrust. It must be as light as is consistent with strength."

Balance is also extremely necessary, Mr. Forkner claims.

"By using gas as the fuel for their metal melting pots," he continues, "the company secures benefits and advantages of heat centralization, cleanliness, and convenience."

✡ ✡ ✡ ✡

MORE THAN 100 YEARS OF UNINTERRUPTED PUBLIC SERVICE—1927
In this Building Beautiful are the Flames that Freeze
THE LOMBARDY, one of New York's finest apartment hotels, of which Farrar and Watmough are the architects, is being erected on 56th Street near Park Avenue by the Henry Mandel Building Company.
Towering twenty-two stories above the street, this building—on the Italian Renaissance style—will be an attractive as well as conspicuous addition to the exclusive Park Avenue residence section.
Great care has been taken to incorporate every device for efficiency and convenience, and this Company is pleased to be able to state that the GAS-OPERATED REFRIGERATOR UNITS, which will be used throughout the Lombardy, have been specified by the architects after an exhaustive independent investigation.
Owners—One Park Avenue Corporation.
Architects—Farrar and Watmough.
Builders—Henry Mandel Building Company.
CONSOLIDATED GAS COMPANY OF NEW YORK

"Flames That Freeze"

The Cleaning of Natural Gas*

Experimental work paves way for practical cleaning apparatus

H. B. Milam

Bartlesville, Okla., Assistant Superintendent, Compressor Station, The Empire Companies

THE cleaning of natural gas is a problem that is as old as the industry itself. There has always been more or less trouble caused by sand, water and oil from the wells, dirt and mill scale left in the lines when laying.

Various types and sizes of drips and separators have been built and installed. Almost everyone connected with the industry, from office boy to manager, has some pet idea for a drip, such as dust traps, or large tanks, cyclone separators, syphons, tee drips, and various other kinds.

Problem Aggravated by Oxygen

A few years ago our problem was made worse due to a small amount of oxygen being in the gas coming from residue plants, usually less than one per cent. This, together with moisture, caused internal corrosion of our lines and traveled as a fine dust. About three or four years ago the trouble became worse on our system, first showing up at our compressor stations, town border or reducing stations, and domestic lines. The various kinds of drips already installed did not prove effective.

At this time the problem was turned over to Mr. J. P. Fisher, chief technologist of the Empire Companies, for solution. We are indebted to Mr. Fisher for the following information on the development of the new type separator:

Development of Dust Separator—Preliminary Work

As a part of the general problem of dealing with dust in natural gas transportation lines, the development of a simple and effective dust separator was thought to be necessary.

A preliminary study was made of the problem in which it was submitted to several manufacturers of different types of equipment designed for this purpose.

A study was also made of the experiments carried on at the Agricultural Experiment Station at Berkeley, California. These experiments were on various types of dust separators, to be used in internal combustion tractor engines, for removing the dust from the air. These tests were quite complete and very helpful in securing a good idea of the possibilities of different types of equipment for accomplishing this purpose. The full report of these facts was issued by the University of California Press, Berkeley, California, May, 1923, Bulletin No. 362. In all twenty-seven different separators were tested.

Three Classifications of Separators

These separators were classed into three general types. The first type was dry separators or separators not involving the use of any liquid. Of the dry separators there were two classes, those using centrifugal force to affect the separation and those filtering the air through a fine meshed filter of cloth or like material. The filtering type would not be adaptable to use with natural gas because of the danger of clogging and impeding the flow. The centrifugal type showed very poor efficiency, the amount of dust removed varying from a little over 40 per cent to about 87 per cent. This is not considered a sufficiently good separation to be worth while.

The second type of separator used water in the separating process. Usually the air was bubbled through water to remove the dust. The efficiency of this type varied from about 89 per cent to about 97 per cent. While this efficiency is better than the dry type it still leaves a great deal to be desired and the use of water in natural gas lines would be objectionable both because of its liability to freeze and because it would saturate the gas with water vapor which would not be desirable.

Contact Method

The third class of dust removing equipment utilized oil in the removal of dust and might be termed the contact method, since the dust was caught and held by the oil either by bubbling the air through the oil or by passing the air through a coarse filtering material wet with oil. The efficiency of this type of separator varied from 96 per cent to 99.9 per cent, and while no type described and tested would be adaptable to the problem of separation of dust from natural gas under high pressures, the general principles which seemed to produce the efficient separation were studied, and formed a basis on which the development of our separator has worked out.

Preliminary experiments were made using air at practically atmospheric pressure and building various designs of separating equipment to go into a glass bell jar about four inches in diameter by approximately 28 inches long. By the use of a glass bell jar as an outer case it was possible to observe the action of the separator and this aided greatly in the development.

Our first model consisted of a rather intricate arrangement whereby the gas was bubbled in fine

---

* Read at Southwestern Gas Meter Short Course, University of Oklahoma, Norman, Okla., April 6, 1927.

streams in a tangential direction into oil and kept swirling in the same direction through a spiral outlet pipe one side of which was formed of transparent material so that the centrifugal action could be observed.

An arrangement was made whereby any desired form of finely divided mateial could be added to the incoming stream of air at a uniform rate and be intimately mixed with the stream of air. This device consisted, briefly, of a charging chamber in which the dust was placed and included a spiral conveyor which could be turned at any desired rate to force the dust out of the container.

This was attached to one side of the inlet pipe. The outlet of this charging tube was slotted and a wire was so mounted on a rotating shaft, at right angles to the charging tube, that as the shaft rotated the wire was whipped through the slot at the end of the charging tube. This rotation was accomplished by means of a small electric motor.

Simple Screen Superior to Centrifugal Action

Our first thought was to break the gas into small streams, bubble it through the oil, and then separate the oil and air by centrifugal action. It was soon found that no measurable gain was made by breaking the air into very small streams. The efficiency of our separation of oil particles from the outgoing stream of air was gauged by the volume of flow that could be maintained without losing oil in the outlet stream of air. The air was measured by an orifice meter. In our work on this model it was found that a screen composed of a number of layers of fly screen would produce a better separation of the air and oil than could be obtained by centrifugal action alone under the conditions imposed by the proportions and forms of our outer case. It was impossible to anticipate what would happen with a large volume passing through the oil from the action of the comparatively small volume possible in our small sized equipment.

From the experiments with this miniature equipment a large sized separator was designed to be of capacity sufficient to handle the maximum gas flow into the town of Bartlesville, basing this capacity on the peak hour load of the winter of 1924 and 1925.

Development of Dust Separator Full Sized Model

From the results of our preliminary work as described above, general over-all dimensions were decided upon for a full sized model separator, intended to handle a volume of air at practically atmospheric pressure equivalent to the volume of gas to be handled by a separator such as would be necessary for the city of Bartlesville. In determining this size it was assumed that the limitation of the separator as to its capacity would be a function of the velocity of the gases going through the separator and that so far as dust separation and the ability to pass gas without losing oil was concerned, the static pressure of the gas going through could be neglected.

On these assumptions the shell or casing of the separator was made 29 inches in diameter and eight feet long.

From our preliminary experiments with the miniature model, it was thought that more air could be handled by the separator in an inclined position than could be handled in a vertical position. Our first design was, therefore, made with the main shell of the separator mounted in an inclined position, the inclination being 22 degrees from the horizontal.

Observation Windows Provided

The shell of the separator was provided with twelve observation windows approximately four inches in diameter. These windows were made by cutting a hole in the side of the galvanized iron shell and fastening a piece of celluloid automobile curtain stock over the hole by means of a bolted ring and gasket so as to make an oil tight joint.

The gas inlet connection was eight inches in diameter and it was located 30 inches from the bottom end of the shell.

Air for testing the separator was furnished by a six-inch high pressure Buffalo cupola fan, driven by a 5 H. P. electric motor. With this fan approximately 900 cubic feet of air per minute could be passed through the separator against a pressure of about 5 inches of water.

Dust was added to the incoming air by means of a galvanized iron hopper in which was mounted a spiral conveyor. The discharge of the hopper was arranged so that it could discharge dust into one of the side openings of the blower. By means of this hopper any desired kind of dust could be fed into the incoming stream of air at any desired rate, by simply regulating the speed at which the spiral conveyor was turned. This conveyor was turned by hand.

The top of the separator shell was fastened on by means of flange and gasket so as to be removable. This top was provided in its center with a 12-inch outlet nipple, coaxial with the shell.

Filter Bags

Filter bags were provided approximately four feet long and of such a diameter that they could be tied around the outlet nipple of the separator so that all the air discharging from the separator had to pass through the filter bag.

The inlet connection was extended inside of the shell by means of a 90 degree ell, extending the air passage downwardly, and made to dip from one-half inch to three inches below the oil level.

A cylindrical screen was also provided for the outlet. This screen was made of ten layers of 16 mesh galvanized screen wire, and was completely blanked off at the lower end by a wooden disc. It was of such size that it could be inserted through the 12-inch opening in the top and was supported by a suitable bracket fastening to the sides of the separator shell.

The separator was first tested out for its general action by putting water instead of oil into the shell to such a level as to submerge the inlet ell connection. Air was then bubbled through the water as

a preliminary test of the effectiveness of the separating outlet screen. When using water the preparation seemed to be perfect as no hint of moisture or mist seemed to be contained in the outgoing stream of air.

Observations on Mineral Oil

The water was then removed and mineral seal oil substituted, mineral seal oil being the fluid which we intended to use in the final separator. It was found when using mineral seal oil that a very fine mist was visible in the outgoing stream of air. After a few hours operation a few drops of oil dropped through from the top of the screen, part of each drop being blown away by the current of air and lost from the separator. In order to prevent this loss the screen was removed and a galvanized iron shield was placed on the top side of the screen to blank off that portion. This shield effectively stopped any loss of oil in large drops, but the fine mist of oil was apparent in the outgoing air.

In order to determine the amount of our oil loss, a filter bag was placed over the outlet connection, having been previously weighed. After one hour and thirty minutes operation it was found that .0281 pound of oil was caught on the bag, this weight being determined by again weighing the bag.

This oil was for the most part apparent as minute droplets on the inside fleece lining of the filter bag. The bag was then replaced and the run continued for another hour and thirty minutes, and again weighed. This time the increment in weight was .081 pound. On a third run of one hour and thirty minutes we secured an increment in weight of .155 pound. After another hour's operation the increment in weight was .2855 pound. These tests showed a continually increasing rate of loss of oil, indicating that as the screen became more nearly saturated with oil a greater amount of oil was lost from the separator. Following these tests for loss of oil a run was made in which dust was added to the inlet air. The filter bag was in position and was weighed before starting the test.

Nearly One Hundred Per Cent Efficiency

This run was continued for thirty minutes during which time 44½ pounds of dust was injected into the entering air. The total increment of weight of the filter bag was found to be .18 pound, and if .09 pound per hour were allowed as increment of weight due to oil loss, the net weight of dust increment on the bag was .09 pound. Since 44½ pounds of dust was added to the incoming air, the amount caught on the bag was approximately .2 of one per cent of that added, or the efficiency was approximately 99.8 per cent dust separation.

The connection between the blower and the inlet of the separator was made by means of a piece of truck inner tube. In order to ascertain the pressure delivered by the blower a copper pitot tube was inserted in the side of the inlet tube with its opening pointing toward the stream of air.

It was noticed that whenever dust was added to the stream of air a very heavy static charge accumulated on the pitot tube so that sparks would jump from the pitot tube over a gap of about one inch and the frequency of the spark would be roughly proportional to the amount of dust added.

It was also noted that the filter bag was very heavily charged with static electricity. The fibers of the bag stood out indicating the charged condition and a small particle of fuzz would jump from the hand to the bag for a distance of approximately one foot. It was thought that this phenomenon indicated that the dust carried a heavy electric charge and that this charged condition of the dust would interfere with its separation from the air stream.

Efficiency Is Merely Relative

It should be noted that the method of testing for efficiency by use of the bag filter is not absolute but relative, as some oil vapor and a slight cloud of dust was visible by reflection in the sunlight leaving the bag with the discharged air. We had no means of measuring the amount of this loss and it would, of course, tend to decrease the efficiency of separation over that obtained and also increase the oil loss. In a gas pipe line the iron pipe is a conductor and is well grounded so that it would be virtually impossible for the dust in the pipe line to be charged electrically to any considerable extent.

It was therefore decided to ground the inlet tube to the separator body and also to the blower by means of a spiral ribbon steel lining inserted in the inlet tube. After the insertion of the steel lining a second test was run adding dust which, figured in the same way, showed an efficiency of approximately 99.6 per cent. While this is a little less than that shown by the previous run, the difference is not believed great and, it is thought, is due to experimental error.

Possible Effect of Static

Since it is a decrease of efficiency it may possibly be that the static charge on the dust assisted somewhat in its deposition in the oil or on other parts of the separator, and the difference is not considered very significant. As the static phenomenon made the operation of the equipment very disagreeable, the steel ribbon lining, grounding the whole apparatus, was left in place for all future runs.

Since the oil loss seemed to be rather large and since the inclined position of the separator was rather awkward from a structural standpoint, it was decided to reset the separator in a vertical position. The above tests are therefore all that were run on the separator while in the inclined position.

With the separator reset in a vertical position the tests were carried on with the idea of decreasing the oil loss. This was accomplished after various tests by inserting into the tank a partition above the inlet pipe. For this parition we used an ordinary galvanized wash tub turned bottom up.

The tub was of a smaller diameter than the tank and was packed around the bottom so that all of the air must come through the tub. Openings

were cut in the side in such a way that the air was in a whirl on entering the upper chamber.

Means Tried to Prevent Oil Loss

Various outlet arrangements were tried for the purpose of preventing the loss of oil. Run down pipes were put in from the upper to the lower chamber extending down so as to be submerged in the oil.

The best arrangement found was a tube made of screen wire wrapper on perforated metal. Eighteen pounds of 16 mesh galvanized screen wire were used. We found that all of the air came through the screen, and that the tube of wire could be left open at the bottom. Also there was no swirl of air at the outlet of the tube, and that our oil loss was practically nothing.

All of our commercial separators are built on this method. Our first commercial separator was installed at Eldorado, Kansas, about September, 1925. On this separator an additional chamber was installed for testing purposes. In this chamber we had a filter bag through which all of the gas passed. By weighing the filter bag before putting it in service and again on taking it out, and knowing the amount of gas passed through, we were able to determine our efficiency, which was a little better than 99.6 per cent.

In the fall of 1925 we installed at our Tallant Compressor Station a 30-inch separator to be used for capacity tests, this plant handling approximately 30,000,000 cubic feet per day at this time. These tests proved that with this size separator we could handle approximately 9,000,000 cubic feet per day.

Capacity of Largest Size of Separator

We then designed and installed a 60-inch separator for this plant, which would handle approximately 35,000,000 cubic feet per day. This is the largest size we expect to build. When more capacity is needed we installed two or more separators.

At our town-border, regulator and meter stations, where formerly we had a great deal of trouble due to cutting of valves, sticking and clogging of regulators, etc., our trouble has been eliminated. At some of our compressor stations our maintenance costs had been running very high caused by the cutting and scoring of piston rods, compressor liners, piston rings, valves, etc. An excessive amount of packing was used, due to scored rods, and a great amount of gas leakage caused a hazard as well as a loss. In addition to this loss, there was a greater one caused by having to shut down our compressor units for repairs when these units were needed to carry the peak load.

Our Tallant compressor station has been protected by a separator since January, 1926, and since that time no trouble has been encountered from dirty gas. The compressor rods, valves, etc., are still in excellent condition.

At the present time we have eight New Type Separator installations in service, all of which are working very satisfactorily.

COURSE IN GAS ENGINEERING AT JOHNS HOPKINS IS UNIQUE

E. B. Luce

THE statement is often made that various universities are offering courses in gas engineering. The Hopkins course, however, is the only full collegiate course, offering undergraduate and graduate work, with gas engineering as the major, which leads to the degree of Bachelor of Engineering for the undergraduate course of four years, the degree of Master of Gas Engineering for two years additional graduate work in gas engineering, and the degree of Doctor in Engineering for the successful completion of an additional year of graduate work in gas engineering.

The work in gas engineering is the major and other related courses in mechanical, electrical and chemical engineering, as well as other required and elective courses, are minors. This is quite different than the submerging of gas engineering courses as minors in a curriculum of mechanical engineering. At Hopkins the courses in "Gas and Fuel Analysis," "Gas Engineering," "Industrial Fuels," "Solvent Recovery," "Refractories," "Gas Manufacture and Distribution," as well as the many research problems upon the fundamental chemistry and physics of existing or proposed gas making processes, the distribution and utilization of gas and the recovery and purification of by-products, constitute the major, not the minor, work which leads to the degrees granted by the university for the successful completion of the gas enginering course.

By-Products Laboratory Only Complete Plant in Country

The gas by products laboratory of the university is probably the only complete plant of its kind in America and is available for research work for students desiring to follow gas engineering. It includes a 400-pound retort, hydraulic main, condensers, tar extractor, scrubbers, purifier, tar and ammonia tanks and gas holder. Meters, calorimeters and complete equipment for the examination and analysis of fuel, gas, and by-products are available in the laboratories of the department.

In order to show the merit of different statements made regarding the opportunities offered for gas engineering by different universities, the following correspondence will be of interest:

Los Angeles Gas and Electric Corporation
Los Angeles, California

Seal
Los Angeles Gas and Electric
L A Service
Corporation

May 12, 1927.

H. L. Masser, Gas Engineer
Mr. Chas. M. Cohn, Vice-President,
Consolidated Gas Electric Light and Power Co.,
Baltimore, Maryland.
Dear Sir:

Pursuant with your request to Mr. Cline, I am sending you a catalog of courses given by Univer

(Continued on page 618)

WINDOW DISPLAY ADVERTISING

That sells more gas to pleased customers

Ray Martin

Display Manager, Consolidated Gas Company of New York

To all June Brides
After the honeymoon you are cordially invited to familiarize yourself with modern gas service
Guessless Cookery
Hot Water Without Waiting
Refrigeration by Gas

The ever increasing non-appliance type of Window Display Advertising is here applied to June brides.

The "copy" begins—"After the honeymoon——" because this is the moment for a gas company to begin a friendly relationship of service with each new housekeeper.

It is difficult to visualize a girl thinking very seriously about gas refrigeration, or an uninterrupted supply of hot water, or a particular type of gas range a few weeks before she is to say "I do." It is even harder to imagine a window display including any one of our many gas appliances together with a June bride in her accepted raiment.

Obviously, if we are to create a June bride atmosphere we cannot show a gas appliance. Then again, if one appliance were to be shown it would limit the observer's interest to it alone; whereas, by eliminating appliances entirely, as illustrated, we stimulate interest in no less than three different types of gas service.

A June bride window display is, for a gas company, about the most perplexing of all similar advertising efforts, and the writer would like to whisper—confidentially—this is the first window display on the June bride idea which he has ever produced that has pleased him.

As The Journal Views It

THE PROPER TRAINING FOR THE GAS ENGINEER

It would seem eminently stupid, if not fatal, to contract with some dentist, no matter how proficient in his particular calling, to perform a brain operation or still to expect that a lawyer will make a good public official merely from the starting point that his record on criminal cases is excellent.

Following the same line of reasoning, even if the comparison is a bit far fetched, it would appear that there is ample need for an out-and-out course in Gas Engineering in a number of our higher technical schools. And we use the term out-and-out in its fullest sense.

In the early days the engineer in the gas industry was largely self-taught and functioned by way of the rule-of-thumb method. Nevertheless, he did good work in his day. However, there later dawned in the minds of gas company executives the lukewarm idea that they should take on some technical graduates. Then for some vague reason the mechanical engineer appropriated the technology of gas manufacture and distribution as his personal and not-to-be-disputed property. He also performed his duties in a satisfactory manner. But ever the industry veered into a specialized channel of engineering procedure so that to-day one might as well hire a young electrical engineer as a mechanical engineer to carry on in gas engineering.

The industry must increasingly seek its technical brains from that class of engineering graduates which has fed largely on a scholastic ration of subjects peculiar to the manufacture and distribution of gas. To merely introduce a few subjects pertaining to gas technology into a mechanical engineering course is at best a half-way sort of proposition.

What with the rapid advance of investigation and research in purely gas matters, it is our opinion that there are gaping openings to be filled in the personnel of our engineering departments. More, if these voids are to be filled in a satisfactory manner to the end that the industry will enjoy fully the commercial and industrial vista that is being disclosed, we must have engineers who have literally eaten, breathed and slept with gas subjects in their undergraduate days.

¤ ¤ ¤ ¤

GAS REFRIGERATION CAN BE SOLD

The sale of one hundred gas refrigeration units to be installed in the Lombardy apartment hotel in New York City constitutes a genuine step forward in this particular line of gas utilization. Further, it reflects credit of a very high sort on the Consolidated Gas Company of New York.

The Consolidated Company, it is quite evident, has not timidly dabbled its commercial foot in the water, wondering with a shiver what it would feel like "up to the knees." On the contrary, it has plunged boldly in and, we beg leave to predict, will be able to keep afloat without fear of any disturbing business cramps. Moreover, this initial start in a big way should hearten those somewhat more timorous souls who hesitate to make the plunge.

Backing up this future installation of one hundred units is a train of sound and logical business procedure. First, the unit was investigated by the gas company from a technical and engineering standpoint. Next service runs in actual use were made and finally, no doubt, came a careful study of the best sales and publicity policy to be followed. We might further venture that this company came to a decision as to whether the game was worth the candle; whether it honestly wanted gas refrigeration units installed to any great extent.

It appears that once the Consolidated Company laid its plans and convinced itself that it wanted to market this appliance, it lost but very little time in bringing sales matters to a head.

If any company is merely lukewarm on the subject of actively selling gas refrigeration, it would perhaps be better to forget the entire matter, and let some outside agency reap the benefits in the particular community. But if any company means business, really wants to sell gas refrigeration, then our advice is to get out and sell it.

It can be done; the New York company has ably demonstrated it.

INDUSTRIAL GAS LESSONS

IF IT'S DONE WITH HEAT YOU CAN DO IT BETTER WITH GAS

Lesson No. 174

Blue Gas

Bituminous Coal Fuel

It was mentioned in the previous lesson that in recent years, due to various reasons, bituminous coal has come to be used as a fuel in the manufacture of both blue gas and carburetted blue gas or water gas. The large amount of volatile matter in the soft coal and the considerable amount of tarry materials that are obtained in the heating of soft coal introduce difficulties in the operation of the gas generator which had to be overcome in order to make the use of soft coal a practical matter in this machine. One of the methods used is to mix the soft coal with anthracite coal or coke.

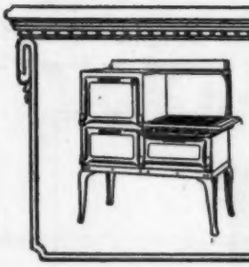
Another method of avoiding these difficulties and maintaining the capacity of the blue gas installation is by means of the so-called Pier process. The Pier process was developed from a study of the temperature and fire conditions throughout the generator, which showed that the temperature was never the same in any one horizontal section of the apparatus. The bed of soft coal was just honeycombed with arches, blowholes, channelling and the variation in the temperature of the bed and in the progress of the fire was very considerable. It is understandable that such a condition is very detrimental to the operation of the generator and to its productive capacity as well. Another condition was the thin formation of clinker in the centre of the bed of coal and its formation high up along the walls of the machine. The net result was that the central portion of the bed offered a much greater resistance to the passage of both air and steam than the side portions, and so the fuel around the walls is rapidly consumed while that in the center remains uncarbonized.

Additional tests were made to determine the distribution of the activity in the fuel bed and it was found that this extends only for a short distance away from the walls of the apparatus.

Pier Process

It was therefore thought advisable to build a pier in the centre of the gas generator, and thus we have the Pier process. This pier is made of refractory material and is cylindrical in form and occupies that portion of the bed which is known to be non-reactive. When the pier is properly dimensioned and constructed, it is possible to obtain a bed in the shape of a ring, through which the temperature is evenly distributed. Carbonization and reaction are thus uniform, and this applies to the clinker formation as well. The clinker is formed flat and is easily removed. There are no accumulations of clinker along the side walls of the gas generator as in the ordinary type. The diameter of the pier is usually three feet for an eleven-foot generator with a grate diameter of nine feet. In smaller generators the diameter of the pier is usually a little less than one-third of the diameter of the grate. This process has been instrumental in removing the difficulties that have surrounded the use of bituminous coal in the manufacture of blue gas and water gas.

Coal is not the only raw material that is used in the manufacture of blue gas. There is also steam, which is consumed at the rate of eighteen pounds to every twelve pounds of coal. The question naturally arises as to what sort of steam to use for this purpose, that is, whether to use exhaust steam, superheated steam or ordinary saturated steam. It is, of course, true that more heat is introduced into the generator when superheated steam is employed and this heat helps to raise and maintain the temperature within the generator. It is just a question whether this additional heat, supplied in the form of superheated steam, is more economically furnished in this form by pre-heated or saturated steam in a superheater, or from the coal in the generator itself. It is true that the reaction between steam and incandescent carbon takes place more readily and rapidly when the steam is superheated, and it is also true that the water gas or blue gas produced is of better quality. The thermal advantages are, however, determined only by making a special study of the existing installation under the operating conditions that prevail in the plant. In using exhaust steam there is, of course, an advantage in that live steam is rendered available for other uses in the works.



GAS MERCHANDISING

Domestic – Industrial

Ideas for the Man Who Sells

William H. Matlack

ARE YOU INTRIGUING YOUR PROSPECTIVE CUSTOMERS' INTEREST?

Advertising that does not beget the attention of the prospective customer is of no value, therefore it is obvious that, first of all, the layout of the advertisement must be such as to attract attention. This means that if your advertisement is exposed and not smothered by poor typography, lack of white space, a picture, or pictures it should attract the attention of prospective purchasers; in other words, accomplish the first step in selling. But to actually get his name on the dotted line, to sell the merchandise advertised, advertising must do something more than attract attention, it must intrigue the interest of the prospective purchaser.

If, for instance, you propose to direct your printed sales efforts to women, first of all try to get the feminine fancy into focus. Ask yourself or some women what it actually is that the woman looks for when she purchases merchandise. If it is a gas range do not think for a moment that she buys it because the price is low, or for the reason that it has a semi-solid top, or because it has an oven heat regulator, or further, because it is all white enamel and is beautiful to look at. After all the reason the home manager purchases the gas range is because it saves her time and temper, or because it will bake lovely biscuits, bread and pies—or maybe it is because "the Browns have one just like it," or "this is a better range than Greys bought."

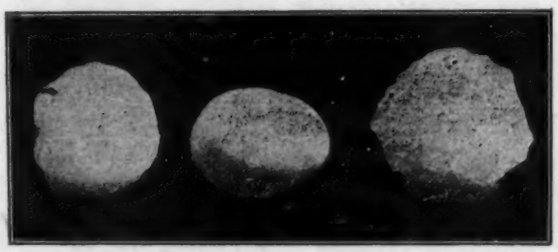
Of course, the aforesaid ancient and honorable psychological factors enter into the picture too and are essential reasons for the purchase—but the advertising that really moves the merchandise from the dealer's warehouse to the home is of the type that implants a picture "of that school girl complexion" or some other picture in the mind of the prospective purchaser.

If the advertisement can cause the prospective purchaser to anticipate "a lovely white kitchen, just a little nicer than the Jones's," or "as good as the Grey's," or if it can cause the prospective purchaser to anticipate pleasure, profit or pride because of possession—your advertisemennt has crossed "the danger line" and it will have transmitted radioactivity to the ring of the cash register.

¤ ¤ ¤ ¤

NEW USE FOR GAS REFRIGERATOR

On Saturday, May 28th, East St. Louis, Illinois, and vicinity were visited by an unusual hail storm. The hailstones (see illustration) were as large as baseballs and came down with such velocity as to puncture plate glass and tiled roofs. Thinking that



Relative Sizes of Hailstones and Hen Egg

the storm was of a local nature and that some folks would say "fish-story" when told about it, Ed. Thomure of the Illinois Power and Light Corporation gathered up a few samples and placed them in

the frost pan of the gas refrigerator in the company's store.

At this writing the flame still keeps them cold, and some one remarked during the storm that "those hail stones must be twice as cold as two below zero." That's saying something for gas refrigeration.

¤ ¤ ¤ ¤

THE GAS BUSINESS IS AS GOOD AS YOU MAKE IT

When the W. G. N. once said, "Business is as good as you make it," they told the truth in a big way, and while they did not say how the gas man was to make it good the recent experience of a southern gas company tends to indicate that the way is via the ADVERTISING route. During the latter part of August, when a southern sun scorches the skin and shrivels up the average man's ambition to do things, this company got busy and laid out a continuous selling campaign to start at once and to take into consideration nothing save the fact that advertising and selling will sell.

On the 25th day of August the company opened the first sale on its schedule: "99c. Puts a Gas Range or Water Heater in Your Home" being their slogan. When the sale closed on the 25th day of September, to use the words of the company's sales manager, "two hundred and seven souls had been made happy." The first sale on the company's program of selling had netted the sale of one hundred and forty gas ranges and sixty-seven water heaters.

This is the biggest sale the company has ever had —time, dollars and cents, new customers and number of appliances sold all considered—and goes to prove that often it is not so hard to make sales as some folks think.

This gas company advertised this sale in a big way, and while some of the copy used in the daily newspapers contained very little selling copy, the majority of it did, as may be seen from the sample advertisement reproduced here. The theme of better homes, homes provided with comforts as are only attainable by the use of gas service and modern gas appliances is always interesting and materially helps to make any sale go over.

¤ ¤ ¤ ¤

CARBURETTED WATER GAS

THE gas is made with an oil which has a substantial carbon depositing content, the process being carried out in a set which includes a generator and a carburetor. There are three steps in making the gas. First, air blasting the fuel in the generator to heat the fuel and passing the hot blast gases into the carburetor; second, passing steam into the heated fuel in the generator to form blue gas and enriching the blue gas in the carburetor, and third, burning the carbon deposit out of the carburetor with air and excluding the products of combustion from the generator. United States Patent No. 1,630,301.

There aint no such animal!

"Oh! we have a coil in our furnace and our Hot Water does not cost us anything" is what you hear a great many folks say — but they simply have not figured out the cost.

One shovel of coal in every five you put in your furnace is used to heat water, and while a coil in your furnace will supply you with hot water (sometimes rust-stained—if you keep your furnace at high pitch) but don't think for a minute that you are getting hot water for nothing or that you have Real HOT WATER SERVICE such as you would have if you used a RUUD Automatic, Storage or Circulating Gas Water Heater.

THIS IS THE TIME TO SECURE HOT WATER SERVICE

ONLY **99¢** DOWN

Puts a Gas Range or Water Heater in your home—while our sale is going on—

ACT AT ONCE

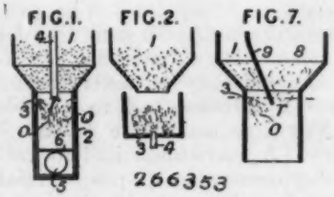
as our sale closes Thursday September 25th.

THE GAS LIGHT COMPANY OF AUGUSTA

PROGRESS IN GAS TECHNOLOGY
Domestic and Foreign

GAS PRODUCERS

A PROCESS for generating a combustible gas for use in internal combustion engines or for heating or lighting purposes consists in injecting air with or without steam into the oxidation zone of a gas producer, a liquid fuel or a solid fuel rich in volatiles, being introduced into the reducing zone. The fuel is cracked or gasified by the heat of the oxidation zone.



In a down draft producer, figure 1, the solid fuel 1 reaches the chamber 2 in which air is injected tangentially through openings 3 into the oxidation zone 0. Liquid fuel is injected through a pipe 4 into the reducing zone r and the gases are withdrawn through a pipe 5 below a grate 6. Figure 2 represents an up-draft producer. In the apparatus shown in figure 7, wood charcoal 1 and a fuel 8 rich in volatiles are separated by a partition 9 and together enter the zones 0 and r respectively, air being introduced by inlets 3.

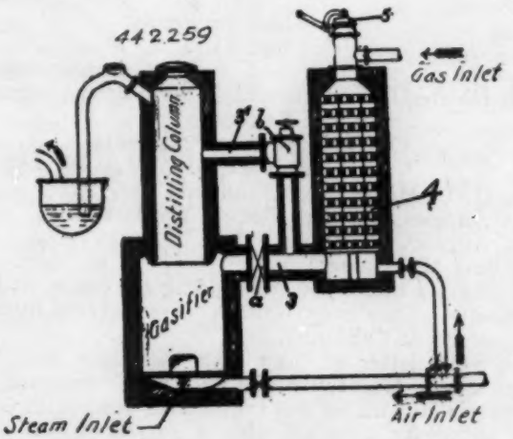
In other modifications air is introduced by a series of inlets forming a peripheral combustion zone and a central reducing zone, or a mass of refractory material is used to accumulate heat and increase reaction surfaces, a catalyst being used to render the mass more active. British Patent No. 266,353.

¤ ¤ ¤ ¤

WATER GAS GENERATOR

GAS is introduced into the drying and degasifying shaft of a water gas generator, this gas being first preheated in a heat recuperator through which the hot blow gases pass. The heat recuperator is connected at the end, at which the heating gases are introduced, as well as at the lower end with a higher point in the drying and degasifying shaft or tower, through a suitable pipe. The waste gases during the hot blast period pass through the lateral connection 3 (see the accompanying figure) into the recuperator 4 and are burnt there by the introduction of secondary air. While this is being done the valve and the stack valve 5 are opened and the valve b is closed.

During the following gas making period of run the stack valve 5 is closed. The two valves a and b are either opened to such an extent that a portion of the heating gases heated up in the recuperator is allowed to pass through the lateral pipe connection 3 into the lower portion of the generator, and another portion is allowed to pass through the pipe connection 3' into a higher portion of the generator, or the valve a is closed and the valve n is opened, so that the heated fuel gas reaches only into the upper part of the generator proper. The temperature and the quantity of fuel gas are naturally so regulated that they are sufficient to produce swelling and drying of the fuel. German Patent No. 442,259.



¤ ¤ ¤ ¤

PURIFYING COAL GAS

AN improvement in the purification of gas, as described in United States Patent No. 1,626,664, consists in treating the gas with subdivided hydrated iron oxide. The gas is made to ascend in the purifying apparatus with decreasing velocity, and then finely pulverized iron oxide is allowed to fall by gravity coming in contact with the ascending stream of gas. The purified gas is then led away from the top of the apparatus.

¤ ¤ ¤ ¤

CARBONIZATION OF COAL

THE carbonization of coal, especially geologically young coals, is carried out with the heating of the coal to a temperature at which decomposition starts or to a higher temperature under an increased pressure, with the evolution of tarry

vapors being permitted. The reaction is carried out at pressures higher than ten atmospheres, and a mass is thus obtained, which at the moment of decomposition, that is, at the temperature and pressure at which decomposition sets in, cakes together, and becomes soft and plastic and has the heating value of a pure combustible. Czecho-Slovakian Patent No. 19,200.

¤ ¤ ¤ ¤

COURSE IN GAS ENGINEERING AT JOHNS HOPKINS IS UNIQUE

(Continued from page 611)

sity of California under their Department of Mechanical Engineering. The work of this university is designed to prepare a student for gas engineering work, although the university does not give a degree of Gas Engineer, but merely the degree of B. S. in mechanical engineering.

I hope that this information may be of value to you.

Yours very truly,
(Signed) H. L. MASSER,
Gas Engineer.

Consolidated Gas Electric Light and Power Company of Baltimore
Office of the Vice-President
Baltimore, Md., May 20, 1927.

Mr. H. L. Masser, Gas Engineer,
Los Angeles Gas and Electric Corporation,
Los Angeles, California.

My dear Mr. Masser:

I want to thank you for sending me copies of the catalogue of the engineering courses offered by the University of California.

In your letter of May 18th you state that the work of the University of California is designed to prepare a student for gas engineering work, although the university does not give a degree of Gas Engineer, but merely a degree of Bachelor of Science in Mechanical Engineering. If you have examined carefully the catalogue of the Johns Hopkins University which I forwarded to you, you will have noted that Hopkins gives the degree of Bachelor of Engineering upon the completion of four years of undergraduate work, the degree of Master of Gas Engineering after two additional years of graduate work in Gas Engineering, and the degree of Doctor of Engineering at the completion of a third year of graduate work in gas engineering.

The gas engineering course at Hopkins is designed to prepare a student for a career as a gas engineer and the courses in mechanical engineering, electrical engineering, chemistry, etc., are supplementary to the major work in gas engineering. This program is quite different from the one set forth in the catalogue of the University of California, where the major work is laid out for reaching the goal of mechanical engineer, and the courses of thermodynamics, elementary heat power laboratory, aerodynamics, hydraulics, etc., are supplementary.

It does not seem to be clear to the gas industry that the only full college course, including both undergraduate and graduate work in gas engineering, leading to a degree in gas engineering, is located at the Johns Hopkins University. Since this seems to be the situation, Hopkins is the only university to which the industry can turn for young men prepared in the best possible ways for careers as gas engineers.

Very truly yours,
(Signed) CHARLES M. COHN,
Vice-President.

Those who know what is involved in the establishment of a new department in a university will best understand and will most likely accept as true the assertions of Mr. Charles M. Cohn, vice-president of the Consolidated Gas Electric Light and Power Company of Baltimore.

Work Necessary to Establish Course

Before a department in a leading university such as the gas engineering department at Hopkins could be established there had to be a pioneer and preparation period. Such was the situation in relation to gas engineering at Hopkins. The gas industry, through the Southern Gas Association, felt and proclaimed the need. They fostered it and secured the consent of the university to enter the new field of gas engineering. Money had to be raised. This was done. Publicity had to be given. Equipment was necessary. A curriculum had to be formulated placing gas engineering in its proper relationship to other studies. A professor had to be secured to head the new department as well as competent assistants. Students had to be secured. All this requires time, vision, courage, good judgment as to the need of the project, money, students, and continuous co-operation between the agencies concerned, viz., the gas industry on the one hand and the university on the other.

Out of this natural and usual process in the establishment of new fields of study in universities has come to the gas industry a new gas engineering department in one of America's foremost universities which is an opportunity and an additional means of progress.

This university offers a curriculum specially laid out to prepare young men for careers as gas engineers; provide the means for working out new problems in research. Over this important work at Hopkins the university has placed one of America's leading scientific men, Doctor Wilbert J. Huff, whose achievements and abilities are now recognized and honored by a sister institution, the Ohio Northern University.

¤ ¤ ¤ ¤

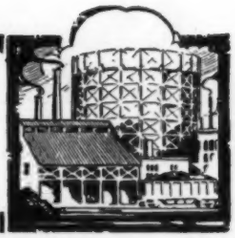
TO KEEP YOUR RANGE IN GOOD CONDITION

Have a brush and a can of black stove-pipe enamel at hand. Keep the brush in a little can of turpentine or kerosene to keep it soft. It is then but a few minutes' work to brush away all the dust or rusty scales, to wash the range with soap and water, and to coat the black portions with a covering of the black enamel.

If you have a gray enameled range use any non-abrasive cleaning paste or powder.

Frequent boiling in soda and water will keep the burners clean.

NEWS OF THE GAS INDUSTRY



Honorary Degree for Dr. Wilbert J. Huff, Professor of Gas Engineering at the Johns Hopkins University

Professor Wilbert J. Huff, professor of gas engineering of the Johns Hopkins University, Baltimore, Md., was given the honorary degree of doctor of science on May 24, 1927, by the Ohio Northern University. Professor Huff was once a student at the Ohio Northern University, later attending Yale University, from which he received his A. B. and Ph. D. degrees.

The Ohio Northern University has granted degrees to a number of very prominent people. It was the first university in this country to give an honorary degree to President Warren G. Harding, a number of years before he became President. It also has among its alumni three United States Senators, namely, Senators Willis and Fess, representing the state of Ohio, and Senator Robinson, representing the state of Indiana, in the present U. S. Senate.

Graduate of Yale

Dr. Huff was born at Butler, Pa., on October 4, 1890. He is an honor graduate of Yale College, class of 1914, and received the rating of Philosophical Oration, which is the highest honor awarded. He also received special honors in chemistry. He took the degree of doctor of philosophy at Yale in 1917. While a graduate student he was Henry Bradford Loomis Fellow, a high honor, and during this period he engaged in teaching.

Since 1917 Dr. Huff has been engaged in chemical and engineering research with the Barrett Co., the United States Bureau of Mines, and the Koppers Co. He was a lieutenant in the Chemical Warfare Service in command of the Princeton research detachment. In 1920 he went with the Koppers Company in charge of the research division of the Koppers Company laboratories. He has had under his direction a number of men engaged in various research problems connected with the by-product coke and gas industry, some in the laboratory, others in the field. This work has taken him over a wide section of the country and into all phases of the gas industry.

Dr. Huff stands ready at all times to co-operate with the men interested in the gas course at Hopkins, as well as with all those who may have any suggestions to make for its improvement and advancement.

He is the author of numerous papers on subjects vitally important to the gas industry.

* * *

Harold K. Seeley Made Superintendent of Distribution at Syracuse—Also Occupies Position of Supt. of Manufacture

Syracuse, N. Y.—Mr. Harold K. Seeley, who has been the superintendent of gas manufacture of the Syracuse Lighting Company, Syracuse, very recently had more responsibility added to his good executive ability. He is now superintendent of distribution as well as superintendent of gas manufacture.

Mr. Joseph Lucena, who has been superintendent of distribution for many years, has resigned. Mr. Lucena is a very popular distribution man in this state and at present is vice-chairman of the gas section of the Empire State Gas & Electric Association.

Revaluation on Gas to Start

Washington, D. C.—The Public Utilities Commission's revaluation of the Washington and Georgetown Gas Light companies will get under way in a few days.

The commission appointed Byers McK. Bachman, its accountant, to the temporary position of valuation expert in charge of accounting work, thus completing the personnel of its expert staff.

Bachman will rank equally with H. Carl Wolf, engineer of the Maryland Public Service Commission, who has been appointed expert in charge of the physical valuation work.

Bachman will be given a leave of absence from his regular position in order to direct the valuation. His appointment was in the nature of an economy move. The commission had been dickering with Andrew Sangster, of New York, but found it would cost about $150 a day to get him and one assistant.

A corps of assistants will be organized by Wolfman and Bachman immediately. They will be housed in the commission offices in the District building.

* * *

Contract for 200,000 Cu. Ft. Tank Received by Western Gas Construction Co.

The Public Service Company of Northern Illinois has let a contract with the Western Gas Construction Company of Fort Wayne, Indiana, for a high pressure tank to be constructed at Morris, Illinois.

This tank is to have a capacity of 200,000 cu. ft. between the limits of 45 and 5 pounds and will be 33 feet in diameter by approximately 97 feet long, with hemispherical heads.

Work on this tank is to start immediately, so that the tank can be put in operation before fall.

New Process for Making Pipe---Will Embody Special Features

Milwaukee, Wis.—Reports that gained wide circulation in the oil fields of a new process for making pipe and a new mill that would have vast capacity for the production of gas line pipe became a fact with the announcement, on June 15, of Smithsteel Gas Line Pipe by the A. O. Smith Corporation, of Milwaukee. The pipe is announced in sizes of 16 to 22 inch diameter and in uniform lengths of from 10 to 30 feet. The mill will have a capacity of four and one-half miles of pipe per day.

Details of the process used are not announced, but it is understood that it is based on the same principle of production as the Smithsteel Cracking Stills and Smithsteel Couplings, both products of the A. O. Smith Corporation which have gained very wide use in the oil field. In addition to its great capacity, the new pipe mill of the A. O. Smith Corporation embodies most advanced operating and engineering methods.

Pipe Can Be Made Uniformly Thick

It is stated that the method makes the production of pipe of uniform wall thicknesses, diameters, and uniform length virtually automatic. According to the reports of the Smith engineers, the new Smithsteel Gas Line Pipe embodies a number of features that will save both time and money i the construction of cross-country pipe lines. Joining especially will be simpler, due to the absolute accuracy to which the pipe is made. The pipe is offered in both plain end and plain end beveled for field couplings or welding.

The 30-foot length probably represents the most outstanding contribution of this pipe to gas line engineering. The company states that the length will be cut to absolute uniformity and will, of course, require fewer joints than the usual 20-foot lengths of pipe.

Another unusual feature about the pipe is that the thickness can be specified by the purchaser for each individual job. Due to the method of building, it is stated that it is possible to build the walls to a greater degree of thinness than is possible by any other method. The pipe line builder, therefore, need specify only the thickness of metal that is needed, in view of the conditions and pressures under which the pipe line will operate. The pipe will also be produced in any specified length from 10 to 30 feet.

* * *

Schaeffer Prone Pressure Method Saves Life in St. Louis

St. Louis.—The Schaeffer prone pressure method of artificial respiration, as used by an efficient crew of gas men (aided this time by St. Louis city firemen), has saved another life, the patient having been overcome by exhaust gases from a carnival tractor.

It was 10:45 p. m. on a recent Sunday when a man trudged into St. Louis Fire Engine House No. 50 with the limp form of Edward Phelps, 2015 South Third Street, St. Louis, tractor operator for a carnival which was showing on a lot two or three blocks distant. The tractor was being used to drive a generator in the lighting plant for the carnival.

The firemen, who have been receiving artificial respiration instruction from some of the gas company men, at once started to work on Phelps, at the same time sending for the emergency crew of the Laclede Gas Light Company. Emergency Men H. Berendes and A. Day, immediately responded, being soon joined by E. Dowley, head of resuscitation work for the company, and District Superintendent E. Goetsch.

With the aid of an inhalator they worked on Phelps until 1.45 a. m. Monday, at which time they agreed with a physician who had been called, that it was safe to take the patient to a hospital. Seven days later Phelps was discharged from the hospital, pronounced completely well.

Western Gas Construction Co. Receives Order for Cinder Traps

The Detroit City Gas Company of Detroit, Mich., has placed with the Western Gas Construction Co. of Fort Wayne, Ind., its order for four cinder traps for erection on their two 10-foot water gas sets and two 11-foot water gas sets, at its Station "B" plant.

* * *

Gas Plant Expansion Program to Follow Sale of Certificates

Jacksonville, Fla.—Part of the proceeds from the sale in New York of $1,500,000 in 6 per cent debentures by the Jacksonville Gas Company is to go into improvements for the local plant, it was announced. Outstanding debentures and bank loans are to be retired by the funds also.

The liens were sold to G. E. Barrett and Company and Frederick Pierce and Company, through the American Commonwealths Power Corporation, which recently acquired the local property.

Just what improvements are contemplated by the gas company are not known definitely yet, but plant expansion and work on gas mains, etc., is considered probable.

* * *

Gas Rate Increase Granted

Indianapolis, Ind. — An increase from 40 to 60 cents for each 1,000 cubic feet of gas consumed by patrons of the Oaklandon Gas and Oil Company at Oaklandon, near this city, has been ordered by the Indiana Public Service Commission. The action was taken in order to conserve the supply of gas, which is derived from a well. It is expected that the higher price will force patrons to use the gas for cooking only.

* * *

William Betts Glen, Sr., Dead

William Betts Glen, Sr., formerly treasurer of the Consolidated Gas, Electric and City Railway Co. of Charleston, S. C., died at his home in Denver, Colo., May 16. Ill-health caused Mr. Glen's retirement from the gas company.

New Baseball Diamond Opened by Brooklyn Union Gas Co.

Brooklyn, N. Y. — The official opening of baseball diamond No. 1 at the gas service station of the Brooklyn Union Gas Company at Canarsie, took place on Saturday afternoon, June 11. Two games were played. The first game, between the Jamaica Shop and the Customers' Service department, began at 12:30. This was followed at 3 p. m. with a game between the Transportation and the New Business departments.

The diamond, one of three prepared by the company for the use of its employees, has been laid out in exactly the same manner as a big league diamond, and it is unsurpassed by any other diamond in Brooklyn, with the exception of Ebbets Field. The engineering and surveying work in connection with this was under the supervision of H. J. Robinson of the Holder department.

At 3 p. m. the Brooklyn Union Gas Club band made its first public appearance. This band, under the leadership of Adolph Schoneberger, consists at present of fifteen men, but is gradually being filled up to a maximum of twenty-five. The band has been faithfully rehearsing several months, and the entire Brooklyn Union Gas Company family had looked forward eagerly to this opportunity of hearing them play.

The band has been outfitted with forest green whipcord uniforms, and they present a fine appearance.

* * *

Six Engineers Study Gas Deal

Los Angeles. — Six engineers from the head office of Stone & Webster in Boston are here to make a survey in connection with a proposed bond issue of the Southern California Gas Company.

The visitors include Thomas Towles, E. J. Boothby, W. D. Stewart, H. Vittinghoff, K. C. Schlos and F. E. Learned, who is in charge of the party.

Details of the proposed bond issue will be announced in a few days, according to F. J. Schafer, general manager of the gas company.

Convention Calendar

June

21-22—Empire State Gas and Electric Association. Annual meeting, Commercial Section, Elmira, N. Y.

20-2—Second Short Course Industrial Gas Engineering, University of Illinois, Urbana, Ill. Charles Greenleaf, chairman, 325 Peoples Gas Building, Chicago, Ill.

July

5-7—Michigan Gas Association. Annual convention, Grand Hotel, Mackinac Island, Mich. Albert G. Schroeder, secretary-treasurer, Grand Rapids, Mich.

Employes of Carnegie Gas Company Banquet Superintendent T. J. White

Waynesburg.—The employes of the Carnegie Natural Gas Company of the Waynesburg district assembled at the Hess Restaurant, where a banquet was held in honor of their superintendent, T. J. White, who has been transferred to another division. Mr. White was presented with a high-powered Remington rifle by the employes. Talks were made by the foremen of the different departments and a movement started to have a get together meeting once a year hereafter.

* * *

Progress on Gas Line to Endicott Is Ahead of Plan

Binghamton. — Progress on the gas line to Endicott from the western limits of Johnson City is so rapid that indications are that Endicott residents will be using gas ahead of the schedule outlined by the Binghamton Gas Works.

The company has purchased a lot on Clarence Avenue, where a pump station will be located. This pump is expected to put sufficient force behind the gas manufactured at the Binghamton plant on upper Court Street to force it through the six-inch main to Endicott.

Waterless Gas Holder for the Pacific Coast

A new gas compressor and holder station has been installed by the Pacific Gas & Electric Company at Oakland, Cal., and is now in service. The gas holder is of the new waterless type and is the second of its kind to be completed on the Pacific Coast.

The compressor station is equipped with three reciprocating, synchronous motor-driven compressors, each having a capacity of 200,000 cubic feet per hour at 50 pounds pressure, and two motor-driven centrifugal boosters each rated 500,000 cubic feet per hour at 8.33 pounds pressure—0.45 specific gravity gas. Practically all of the electric equipment together with the centrifugal boosters is of General Electric design, including an 8-panel, 4-kilovolt, truck-type switchboard, six panels of vertical boards, exciters, etc.

The holder is 218 feet in diameter, 310 feet high and is constructed of 2,800 tons of steel. It is sealed with approximately 52,000 gallons of tar. It has a capacity of 10,000,000 cubic feet and will deliver a constant gas pressure of six inches of water column, regardless of the volume of gas in the holder.

The station is located approximately four miles from the present generating plant and the holder is filled during the night. During the day gas is sent out from the holder to consumers.

* * *

Lower Rates for Gas

Lewistown, Pa.—The Penn Central Light & Power Co., which is building a $500,000 gas plant here, announces a reduction of 20 cents per 1,000 feet or from $1.80 to $1.60 per 1,000 feet for the first 2,000 feet or fraction thereof consumed. For the next 3,000 feet the cut is $1.60 to $1.30, and for the next 5,000 feet the drop is to $1 per thousand feet and all gas consumed over ten thousand feet per month drops to 80 cents per thousand. This includes the prompt payment plan of 10 per cent reduction per month, the same as is in vogue today.

Gas Company Granted 15 Cent Rate Increase—Piedmont Consumers Will Pay 72 Cents Per Thousand

Piedmont, W. Va.—A temporary increase of 15 cents per thousand cubic feet of natural gas has been granted by the Public Service Commission to the Cumberland & Allegheny Gas Co., serving the consumers of Piedmont. The present rate for Piedmont is 57 cents per thousand and the new rate will therefore be 72 cents.

The commission eliminated the "step-up" rates, allowing the flat 15 cent increase. Under the "step-up" rates, the consumer was charged more for the second 10,000 cu. ft. of gas consumed. Piedmont consumers have been paying 61 cents per thousand for the second 10,000 cu. ft. and 65 cents per thousand for gas in excess of 20,000 cu. ft.

Forty cities and towns in West Virginia are affected by the increase, including Buckhannon, Phillipi, Kingwood, Parsons, Elkins, Thomas and Keyser.

* * *

Long Island Lighting Company Makes Application for Extension of Service

Albany. — The Long Island Lighting Company has made application to the Public Service Commission for permission to extend its gas service lines into the town of Riverhead, Long Island, and serve residents there with gas under conditions in a franchise granted by the Riverhead Town Board on May 4, 1927.

* * *

Gas Main Extensions in Hanover Authorized

Brockton.—Directors of the Tenney Service have authorized the expenditure of $15,000 for gas main extensions in Hanover from the Plymouth County Hospital in Cushing's Corner, a distance of three miles. The company has awarded a contract to C. A. Batson Co. to build a meter house in Plympton, the cost of which will be $1,000.

Safety Director Accepts Position with Counties Gas & Electric Company

Roy M. Godwin, safety director of the Northern Indiana Public Service Company, has resigned his position and has left for Morristown, Pa., where he will accept a like position with the Counties Gas and Electric Company. Mr. Godwin went to Fort Wayne, Ind., from the U. G. I. Company of Philadelphia, where he had been nine years. This company formerly operated the Northern Indiana Public Service Company. As safety director for the Northern Indiana Company, Mr. Godwin has spent five and one-half years in Fort Wayne. He has been active in chamber of commerce work and was specially prominent in safety work in the city and parochial schools.

* * *

Ask Gas Line Permit

Denver.—The San Luis Valley Public Service Company has petitioned the Public Utilities Commission for permission to lay a natural gas pipe line in the San Luis Valley, the purpose to furnish citizens of the valley with gas. Michael Finnery, Frank P. Lynch and S. H. Weber are the incorporators, the capitalization given at $300,000, and this will be increased. Alamosa, Colo., a growing city, and the headquarters, will get the benefit of the gas.

* * *

Second Annual Outing of Pennsylvania Gas Association to Be Held Near Reading

The second annual outing of the Pennsylvania Gas Association will be held at the Green Valley Country Club (formerly the Pomeroy Country Club), near Reading, Pa., on Thursday, June 23, 1927, and will be an all-day affair.

Tickets are $3.50 each and may be procured from Mr. Allyn C. Taylor, care Consumers Gas Company, 441 Penn Street, Reading, Pa.

Gets Ten Year Franchise

Sterling, Col.—The Public Service Company of Colorado has been granted a ten-year franchise to serve the city of Sterling, Col., with gas and electricity. It will spend about one million dollars during the next few years to improve and enlarge the plants to enable it to meet the demand. On May 20 Vice President and General Manager Clare N. Stannard and his aides made an inspection and agreed upon the ways and means.

* * *

Stacey Mfg. Co. Receives Contract for Holder and Tank

Rome, Ga.—The Central Public Service Corp. of Chicago has placed contract for the Stacey Manufacturing Company, Cincinnati, O., for the erection of a 100,000 cu. ft. inner section holder in steel tank at Rome, Ga. Holder will be arranged with cup for future extension or an ultimate capacity of 200,000 cu. ft.

Greensboro, N. C.—The Stacey Manufacturing Company has received contracts from the North Carolina Public Service Company for the installation of a 50,000 cu. ft. high pressure storage tank at Greensboro, N. C., and tank of the same capacity for erection at Winston-Salem, as well as a large purifier for installation at their High Point plant. Erection on the three units will start early next month.

* * *

Closed Conference on Gas Rate Plan Is Held

Joplin, Mo.—Commissioners held a closed conference to discuss the city's opposition to an application of the Joplin Gas Company before the Missouri Public Service Commission to install an optional gas heating rate in 300 to 500 Joplin homes.

The conference was held at the request of City Attorney R. A. Pearson, who is preparing the city's answer to the application. Pearson expects to complete the answer and file it at once.